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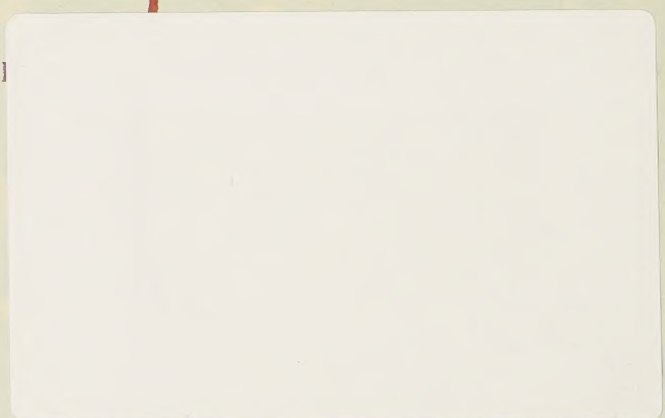

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The Process Year Book

Edited by WILLIAM GAMBLE

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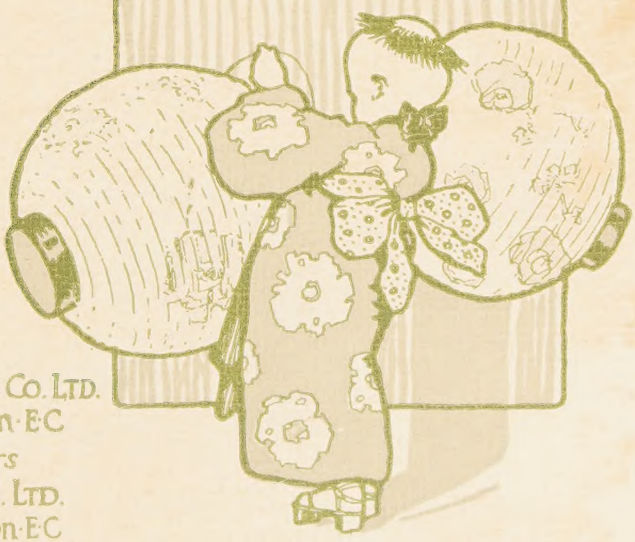
1910–11 VOL. 16



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The Year's Progress in Process Work.

By THE EDITOR.

HEN we expressed the view, in our last year's article on the position and prospects of the trade, that the beautiful processes our Annual seeks to perpetuate were evidently on the down grade through unhealthy competition and owing to the mad race for speed and output it was thought by some of our readers that we took a rather pessimistic attitude. The more thoughtful, however, agreed with our remarks, and joined in regretting the constant cheapening of the product of the process industry.

It cannot be said that the situation is much changed. Matters may be no worse in regard to price cutting, but they are certainly no better. We do notice, however, a distinct tendency towards the consolidation of the trade into more businesslike lines, and it is possible that along with this will ensue a disposition on the part of the trade to take a more dignified view of their business.

The Trade Merging into Large Businesses.

A hopeful sign of the times is that the trade is shifting more and more into the hands of large firms with adequate capital, who are moving into more suitable buildings, in many cases specially built for the purpose of their businesses. The workmen are being given better hygienic surroundings and the equipment of plant is being much improved.

Better Conditions of Working.

Time was when any sort of a place was considered good enough for doing process work in, or at any rate such inconvenient places had to be tolerated because a business had grown up in them from small beginnings, and it was not easy to make a change. One small room had been added after another, each addition making the business more difficult to manage, until such firms found that instead of extending further in such awkward situations it was more economical to move into a properly erected or properly chosen building.

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Sounder Business Principles.

With increased establishment expenses it became necessary to work on more sound business principles, and charges for work had to be proportioned more closely to actual cost. The change has brought about a greater regularity of output, and more uniformity of quality. Customers have begun to find that it is better to pay a fair price to have their work delivered punctually and of a uniformly reliable quality. They have also possibly found that they could not so easily " bluff " a substantial firm into accepting work at the low prices quoted by small firms.

Better Position of the Workmen.

Along with this improvement in premises, in equipment and in organization there has come about a great improvement in the position of the workmen. Instead of working under conditions which were often little different from that of a " sweating " shop they are now installed in comfortable work-rooms, working regular hours, and earning a decent wage. We do not say that wages have improved, but they have been levelled up, and more or less standardized.

A Drawback and Danger.

Whilst on the whole, then, this tendency of the trade to pass into the hands of large firms has been all for the good of the business, there is one drawback and danger to it. As a constant high pressure has to be kept up to meet the increasing demand of the customers for quick and reliable work, there is a tendency for the trade to drop into grooves, and there is no effort made to carry out any radical change in working methods.

No Inclination to Experiment.

There is no inclination to try new processes or to improve existing ones. Employers have no desire to try experiments, and the workmen are not encouraged to essay new departures on their own account. There is no time, in fact, for the constant stream of work comes in and must be got out to time. The most successful firms are those who can avoid slack time by having a fairly constant turnover of regular orders.

Better in the Old Days.

In the old days it was very different. The founders of the firms were often men of artistic or scientific temperament who had a strong inclination to be constantly experimenting to improve their craft, and their workmen were encouraged to experiment during the frequent slack time. Outsiders who brought in a new process or a new piece of apparatus were accorded a ready trial. Thus there was never a dead level of uniformity about the process firms. Each had some speciality which gave them a distinctive individuality. The business was more akin to art work than to a purely commercial industry such as it is now fast becoming.

Employers no doubt find it more profitable to run on such rigid businesslike lines, but it may be doubted whether it is for the good of the trade as a whole to ignore altogether any attempt to improve existing methods, except in so far as they may be improved by constant practice.

Lack of Encouragement to Improve.

Such experimenting as is now being undertaken is being done chiefly by the technical schools, or by supply firms, and in a few cases by private individuals. In the case of the work done by the technical schools no doubt the effects of it eventually filter into the process studios, though there is a tendency to sneer at such efforts, and to repel the students who try to gain an entrance into the trade. Private inventors meet with little encouragement, and nowadays it is almost impossible to get any firm to look at a new process, much less to pay

the fees which were so often obtained in the old days for promising ideas. As regards the supply houses they find that the probable sales of new apparatus, according to past experience, will hardly pay for the cost of remunerating inventors, making drawings, models and patterns, to say nothing of the cost of patenting, which after all is but a doubtful protection if we may judge from the Levy Acid Blast action and some other recent cases.

The Weakness of Patent Law.

So long as the English patent law stands on its present basis it seems to be an absolute waste of money to patent any invention. Until the law says that the man who is first to bring his invention to a stage of public usefulness—irrespective of the fact that there may have been some crude suggestions of it previously which have never matured—there will be no encouragement for inventors to devote their brains, their time and their money to the evolving of new ideas. As things are now there are firms who do not scruple to purchase a successful machine or piece of apparatus and use its parts as patterns in the construction of an imitation which is intended to undersell the original article. This can readily be done since they have not had the cost of the original experimenting, designing, drawing, model and pattern making, etc., to do, nor have they had the expense of advertising to make known the advantages of the new invention.

It is not only in process work that this state of things exists, almost every trade suffers from it more or less, and until Parliament passes a law which shall say that the depositing of a set of drawings or photographs of a machine at the Patent Office, or in some other Government registration department, shall be an effectual bar to the machine being copied in its form and detail, there can be no protection for manufacturers against such gross piracy as now exists.

Reasons for Lack of Improvement.

This sort of discouragement that meets inventors and manufacturers accounts for much of the lack of improvement in ways and means that seems evident in the process trade to-day, and coupled with such discouragement is the indifference with which the trade now views new processes, new materials and new apparatus. The trade is content to run along on old lines, however uneconomical they may be, just because everyone has got used to them, and everyone is so busy thinking how to make or how to avoid a further cut in prices that they do not want to think of any way of bettering their position. The gospel of cheapness seems to be the only one that is heard, and the trade holds itself so very cheap that its customers despise it and view it as a business which can be squeezed in its prices to the last halfpenny.

The Only Way to Improve.

To our way of thinking the only way of elevating the trade is by improving the processes and the plant, and thereby advancing the standard of the product, so that the customer may feel there is something to pay an increased price for. It is in the dead level of mediocre work that price cutting reigns rampant. Firms who have secured a reputation for quality and punctuality are able to withstand somewhat the constant running down of prices, and if they will only take a dignified attitude in their business and refuse to be beaten down they will be more likely to be respected by the customer if they can back up their demand for a fair price by consistent good quality and service.

Lithographic Offset Printing.

We predicted in our last volume that the greatest development might be looked for in the direction of offset printing, and certainly considerable progress has been made, though it cannot be said that all that was expected of the process has been realized. Half-tone process firms thought it was absurdly

easy to make plates for the offset press, and lithographers thought they had only to get the plates to be able to print them. Now, however, the one trade is blaming the other for not knowing how to adapt the half-tone process to the new method of printing. The fact is that standards which have been adopted for half-tone for letterpress printing have to be considerably modified for offset lithographic printing. It has been found that it will not do to simply make a photo print on metal, without etching it, as a basis for offset transfers, and one of the mistakes most commonly made by process firms is to give the lithographer an inked albumen print, for when this is " washed out " and rolled up the image has in most cases half gone or lost all its delicacy, for the simple and obvious reason that the underlying film of albumen prevents the ink from making intimate contact with the metal plate. Processes are wanted, therefore, which will bring about this intimate contact of the ink with the metal, and such processes are available if the process worker will only take advantage of them. The most successful way of making plates for offset transferring is to make an intaglio half-tone on copper. Then there is no possibility of the lithographer spoiling the plate, or spreading and smudging the dots. He pulls his transfers in the same way as from an engraved copper plate and the transfers are rich in ink. This proves what we maintained in our last volume, that the success of offset printing would lie in a combination of intaglio with the offset principle, and this way of making the plates is a preliminary step towards it. The next one will be to have the intaglio etching on the offset printing plate. When this is accomplished we shall get a richness and crispness which is at present lacking in offset work. In the best of half-tone work from the offset press that we have seen so far there is something wanting. Put a good half-tone block print on coated paper alongside an offset half-tone on rough paper and you can see then how much is lost—so much indeed that it does not compensate for the much vaunted advantage of having the print on plain or matt surfaced paper. Equally so the effect of type matter printed on the offset press is not pleasant to look upon.

In the case of colour work it is different, for one colour may be built up on another to get the necessary strength and crispness. We have seen some extremely pretty colour work done on the offset press during the past year, and the supposition that the work would not be in good register by this method of printing is not borne out in actual experience. An effective example of offset colour work is a cover for a work issued by the " Times " Book Club entitled " Best Book for Boys and Girls." In this job there were two reds, two blues, a yellow and a black working on cartridge paper, and it was printed, we understand, on the Harris press. The print is very bright, whilst the chromatic effect is equal to a ten-colour chromo. The floral subject which we give in this volume as a specimen of the work of the Harris press is also an admirable example to show the possibilities of offset printing for colour work, and when it is noted how few are the colours used, and that the prints were run off at the rate of 5000 per hour, the result is certainly marvellous. Messrs. Mann & Co.'s inset in this volume, printed in ten colours on their offset machine, demonstrates the possibility of getting good register and purity of colour on the offset press, though some litho printers have been inclined to doubt it.

Offset Printing for Book Illustrations.

The only book we have seen up to now illustrated throughout by offset printing is a work entitled " Letters of English Seamen, " by Miss E. Hallam Moorhouse, published by Chapman & Hall. In it are sixteen plates from old prints and, we understand, these were printed on the Waite & Saville offset press. The half-tones, which are done with 133-line screen, were first prepared on stone

A Portrait Study.

Amalgamated Press Limited (Process Dept.)

Photograph by W. Gill.

Printed by the "Relievogravure" Process.

and retransferred to the zinc plates required for the rotary machine. This work was done by Messrs. Pemsel & Lembke, who have made a speciality of preparing work for the offset press. The originals were old steel plates, and where these were in good condition the result is excellent. Of course, accustomed as the public are to the crisp sharpness and blackness of the half-tone block printed on art paper, the effect of offset printing is somewhat grey and flat, yet not unpleasing. No doubt the public taste will have to be educated to offset printing just as it has been to half-tone printing. The greyness will probably disappear as ink makers better realize the needs of offset printing, and as printers become more accustomed to handling half-tone offsets. This method is just as much in its infancy as half-tone printing was fifteen years or so ago, when letterpress half-tones were also often grey and smudgy.

Catalogue Illustrations by Offset Printing.

Whilst the field of catalogue work is looked upon as the one where there is the most scope for offset work it cannot be said that progress has so far been very marked. We have seen fashion designs, machinery, motor cars and other familiar objects of commercial illustration portrayed by this method, and in an American trade journal—the *Inland Printer*—there have been printed four pages from half-tone blocks and type and the same four pages printed on the offset. It must be confessed that the result does not appeal convincingly in favour of the offset method. There is something captivating about it, but when one turns to the corresponding typographic examples one has a haunting feeling in favour of the old love. The hard glazed paper so smooth to the eye and touch, the dense black ink, the cleanliness of tone, the delicate softness of the vignettes, and the general vigour of the whole strongly appeal. It is like looking at a smart, well-dressed man in the case of the typographic half-tones, and at the grey shabby commonplace of the very ordinary man in the street in the case of the offset. We are inclined to think that offset printing has far to go yet before it captivates the wealthy merchant who spends his money lavishly on catalogue matter. For the cheap catalogue, where paper cost is a consideration, offset printing may prove of immense value.

Offset from Type and Blocks.

In one way offset printing for catalogue work will have a considerable obstacle to overcome, however much it may be improved. It must always be remembered that there are millions of catalogue blocks already in existence, and there are also no doubt millions of pages of standing catalogue matter in the hands of printers. What is to be done with this material is the question that must be answered before offset printing can be considered. This fact makes us wonder why printing machine makers have not essayed to construct a flat-bed offset press that will work from flat formes of type. The thing has been done in the tin-plate printing machines, which were the forerunners of the offset presses, and there seems to be no reason why it should not be done on machines for printing on paper. We are aware that something of the kind is done by the "Huereka" machine for newspaper printing shown at the Brussels Exhibition this year, but we would like to see what can be done for a finer class of work. Again, it will be noticed that the tendency of makers of offset machinery is all towards sheet-fed rotary machines, but the machine described by Mr. Goodman on another page of this volume shows that a rotary feed is quite practicable. A rotary machine without a web feed for the paper seems a mechanical anachronism, and a much higher speed, together with simplicity of construction, might be attained by taking the paper from the reel. When this change is brought about the possibilities of the offset press for newspaper and magazine printing will be much more obvious.

Rotary Intaglio Printing.

In our last volume we expressed the opinion that rotary intaglio printing would go hand in hand with offset printing. The two processes have much in common. Each has its limitations, but worked conjointly they may help each other. We shall not be surprised to find firms combining the two methods. One of our contributors, Mr. J. Widdop, a lithographer of wide experience and possessing expert knowledge of rotary lithographic work, is a great believer in this union of the two methods, and the fact that he has joined the staff of the Rembrandt Intaglio Printing Co. seems to indicate a confidence in the possibilities of such work. Notwithstanding the appearance of several competitors in the field of rotary intaglio printing, and the rumours of many others at work on the same lines the Rembrandt people are to be congratulated on the strong lead they maintain. It will take a great deal to shake the foundation of the splendid and world-wide reputation they possess. Our frontispiece this year is a worthy example of their recent work. Their new colour process also continues to develop, and a good example showing its application to book illustration is included in the book "Colour Printing and Colour Printers," just published by Pitmans. In this specimen we notice that the printing is on ordinary smooth white book paper, showing that the comparatively thick-toned paper hitherto associated with Rembrandt printing is no longer a necessity.

This year we introduce a new candidate for public favour in the line of rotary intaglio printing, giving an example of the new "Allezzogravure" process of Allen & Co., the well-known photogravure printers. It is certainly very creditable work.

Much has been heard from the Continent of the Mertens process of rotary intaglio printing, which is being particularly applied to newspaper illustration printing. So far only specimen copies have been printed, and therefore they cannot be regarded as convincing evidence of the capabilities of the process for daily or even weekly journalism. The results are very good as far as they go, and for one thing they demonstrate the adaptability of intaglio printing to the commonest of papers, and the possibility of working at a much higher rate of speed than was hitherto thought possible of attainment by this method. As Mr. Fishenden points out in his article in another part of this volume, the Mertens process is not truly a photogravure process, as is the Rembrandt one, but is an inverted half-tone process with distinct half-tone screen dots, only they are sunk instead of raised. Thus the process does not yield results of the same richness as the Rembrandt method, and the plant is more elaborate. If there is any saving of time in the production of the engravings it can be but slight. We understand that a London firm is experimenting with the Mertens process, and probably we may see some application of it here in the near future.

Collotype.

It is a matter for regret that there is absolutely nothing new to record in regard to this beautiful but sadly decadent process. No new firms are being established and no new developments are noted in the old ones. We have heard of some effort being made to take advantage of the greatly improved qualities of panchromatic dry plates in order to revive the idea of collotype printing in colours, which certainly ought to be made more practicable by the lessened amount of retouching which improved colour rendering would give. In this connection we would call attention to the pretty example of three-colour collotype by W. & T. Gaines, of Leeds, given in the book just issued entitled "Colour printing and colour printers." This shows the capabilities of the process. Some Continental firms are also doing some excellent collotype in colours, and Messrs.

Bemroses' work for several years past in this direction should also be mentioned. Mr. Hollyer, jun., of Kensington, has also produced some very charming reproductions of water-colours by collotype. The example we gave last year of a three-colour print done on a new rotary machine by the firm of Danesi is further evidence of this tendency towards the development of collotype in colour. The famous Medici reproductions in colours of the Old Masters now being sold in the print shops are collotypes, or have a collotype basis. We should not be surprised to see a revival of the process for this particular object of colour reproduction for which it has many advantages—for instance, the ability to work direct from the original negatives, the absence of mechanical grain and the ability to work on unglazed papers. We are surprised that no one has essayed to apply collotype to offset printing. It would seem feasible to make the collotype plate on aluminium and put it on the offset press, which might be expected to yield a more softened print than the direct one from the plate. It is possible also that the less heavy impression and the fact that the rubber sheet would not dry up the plate, as does the paper, would have advantageous effects. Even if it should not prove practicable to work the regular collotype film in the offset press it is certainly possible to use the collotype plate for pulling transfers from, these being retransferred to zinc or aluminium. Those who wish to experiment in the production of reticulated gelatine surfaces should study the article by Major-General Waterhouse in this volume on the work of Paul Pretsch, as this will offer valuable hints. There is also a suggestion made by Mr. F. Dogilbert in an article on the uses of ichthyol, which is also worthy of attention.

Grain Processes.

We cannot help thinking that the public—or at any rate the art-loving section—have become somewhat sated with the half-tone process, and there is a desire for something less formal and mechanical. A distinct revival in public taste and appreciation for the old processes of mezzotint and aquatint is noticeable and the favour in which such processes as photogravure and collotype are held is further evidence of this trend of the times. It seems incumbent, therefore, upon half-tone workers to bury the ruled screen, if not by doing away with it altogether, at least by hiding its aggressive obviousness. The introduction of an under-tint by a second printing is an excellent way of modifying the harshness of the ruled screen, and there are some good examples in this volume, notably those of Messrs. Carl Hentschel, Ltd., which can be found by turning to the index of two-colour prints. Some firms have made effective use of the metzograph screen —notably Messrs. Siviter Smith & Co., of Birmingham—for their duotypes, employing the grained screen for the under-tint. But we should like to see more work done with this screen by itself, as we have great confidence in its possibilities. Its inventor, Mr. Jas. Wheeler, has laboured hard for over ten years now to popularize it, but the trade have become so wedded to the ruled screen that it is hard to induce them to give the grained screen a fair and sufficient trial. It may be that the way of using the metzograph screen has not been well understood, but this can no longer be pleaded as an excuse since Messrs. Penrose & Co. have issued a thoroughly instructive booklet explaining in detail the best methods of using the screen. Much finer work might be done with it by working with the screen in the printing frame instead of in the camera, as Mr. G. C. Laws has shown in an article in the present volume. We plead for a fairer and fuller trial of this screen, which should be of especial value for offset lithography.

Paynetype.

The reception which has been accorded to this process by the trade has been distinctly disappointing. For years it has been the dream of many a thought-

ful photo-engraver to make the exposure direct on the metal plate in the camera, and yet when the means of doing this is offered it is looked upon with indifference, and the trade proves to its own satisfaction that it is so much better to do the work by the old roundabout way of making a negative and a print therefrom on the metal. The reasons given are cogent but not entirely convincing. There are some new processes which fail because they come too soon, before the time is ripe for their development, and there are others which equally fail because they come too late, long after their proper sphere has passed away. We are not sure into which category Paynetype falls. Had it appeared ten years ago, when processes had not attained to their present perfection, in facility of execution, Paynetype would have been welcomed as a necessity fulfilled. However, we still incline to believe that Paynetype has a future before it, though it may be that the exact sphere of its influence has yet to be defined. That it will prove a most suitable process for doing process work in a small way in out-of-the-way places, where a regular process plant could not be supported we do not doubt. A country newspaper, for instance, may have on its staff a smart young photographer who could soon master the process and quickly turn out the half-tone of a local event, which would possibly never have been illustrated had the ordinary half-tone process to be depended on. Again, we believe that Paynetype will be found to have great value as a printing process, the plates being used for printing on to from the usual line or half-tone negatives. The process has the great advantage over the bichromate processes in that the printing can be done by gaslight instead of by powerful electric light. Paynetype plates may also prove very valuable for processes of printing from ordinary continuous tone negatives in conjunction with a ruled screen or metzograph screen in the printing frame. Again, it should be valuable for poster work by projection, since we are assured by the inventor that it is possible to coat large plates economically, or to provide process firms with the means of doing the coating themselves.

Machine Etching.

The past year has been one of progress in this direction. There are few firms now which do not possess an etching machine of some sort, and there is now a feeling that any kind of an etching machine is better than the old tub etching method. In regard to the type of machine favoured it has proved to be a case of the survival of the fittest. The Levy Acid Blast has now been on the market in England for five years and several of the machines have been running for nearly that time. There can be no doubt that the machine has better fulfilled the practical requirements and the exacting conditions of process etching than any of its numerous rivals. Some of these have gone to pieces literally, others have developed the fault of uneven etching, whilst others have not been taken seriously by the trade and have met with an untimely extinction. The Levy machine has come into more and more extended use and favour, especially in the larger houses, for whenever there is enough work to do this machine demonstrates its capability of doing it. The legal action in connection with the patent rights of this machine fully brought out its advantages, and though the case was lost on a legal technicality it was a triumphant vindication of the superiority of the acid blast machine and process over every other method of mechanical etching. The Levy Acid Blast can now be reckoned as a firmly established necessity in the equipment of the up-to-date process shop.

Colour Printing.

It cannot be said that there has been any marked advance in three or four-colour block making. The work is undoubtedly being turned out with greater rapidity and certainty, and of more uniform quality. Those firms who are

Miss Kitty Mason.

Miss Nancy More.

André & Sleigh, Ltd.

Pictorial Agency

making a speciality of colour work are no doubt finding it pay better owing to evenness with which the work can now be turned out. But at its best it is an expensive process to work, and can never be very profitable at the prices which now prevail. Those who combine it with printing—as one of our contributors, Mr. W. M. Noble, thinks it should always be combined—may do better than by only making the blocks. But that raises up the vexed question whether process firms should compete with the printer. Our view is the old-fashioned one of "every man to his trade," and "let the cobbler stick to his last." We do not think the process man can ever be a successful printer from a pecuniary point of view, and to take on printing is only to increase his responsibilities whilst alienating some of his customers. Far better is it for him to cultivate the friendship of the printer and educate the latter towards getting the best results out of his blocks.

In regard to the method of operating the processes and the means for the same there is nothing new to record. But Mr. Klein in his article elsewhere in this volume indicates some new developments in collodion emulsion work which may have some influence on the future. The new colour dry plate announced by Ilford, Ltd., is likely to prove a valuable aid to successful colour work, judging by the preliminary trials we have been permitted to make with samples of the plates. The Ilford people have been able to achieve the hitherto apparently incompatible unity of the qualities of high speed with cleanness of working and good colour rendering. We have a high opinion of the qualities of this plate.

Wet Colour Printing.

We referred in our last volume to the process of "Wet Colour Printing," and since then considerable progress has been made with it. We believe the machinery for working the process has been acquired by one of the leading London illustrated weeklies, so that we may soon expect to see results produced here. The particulars of the process which have been published show that it is a very ingenious method of overcoming the difficulty of successively printing the various colours without waiting for the intermediate drying. The colour blocks are first made in the ordinary way, then electros are made from them. An overlay is cut and attached to the face of the electro, the two being then run through a press, so that the heavy pressure applied causes the overlay to emboss the plate. The latter is then put into a planing machine which shaves off the back of the plate level, and thus leaves the surface permanently embossed. In this way any further make-ready on the machine is rendered unnecessary. It would, in fact, be impossible to have any make-ready by means of overlays, for the reason that all the colours are impressed on to one cylinder, the sheet to be printed remaining on this cylinder until the three or four colours have been successively impressed upon it. The colour plates are routed out so that there is as little overlapping as possible, and thus difficulties due to the mingling of the wet colours are avoided. It will be seen, therefore, that the process is really the compromising of a problem which has long occupied the minds of colour printers—how to print one colour over the other without waiting for the previous colour to dry. If this problem can ever be fully solved so that ordinary blocks can be printed on ordinary machines, colour work will take a great leap forward. Some advance has been made towards this end by firms who work the Tandem Miehle system where three ordinary flat bed machines are connected together so that the sheet passes from one to the other, and also in the Lambert machine, which practically consists of four flat bed machines blended into one. The results of these systems are not

yet, however, all that can be desired. Much has yet to be done by the ink maker and paper maker, and possibly also by the block maker before the long desired end is attained.

Poster Half-Tones.

An increasing use is being made of the half-tone process for the production of posters which hitherto have been drawn by the hand of the lithographic artist, and it is a sign of the progress of the times that the well-known and eminent lithographic poster printers, Messrs. David Allen & Co., of Harrow, have devoted a large amount of attention to this subject. They have turned out quite a number of very fine posters in monochrome and colour, and the specimens with which we have been favoured show that the process has been brought to a high state of perfection. Although this firm is essentially a lithographic one they have apparently found it the most practical way to make large blocks for letterpress printing, and have spent a large amount of money during the last sixteen years in laying down special plant for making their large blocks in half-tone and colour. We understand that the prices for these blocks are low and the blocks can be made more quickly and cheaply than by lithographic drawing, whilst being certainly more realistic. The specimens submitted to us include a reproduction of a fine crayon portrait in black of the late Sir Henry Irving ($18\frac{1}{2}\times23$ inches), a reproduction in black line of a lace curtain ($38\times58\frac{3}{4}$ inches), a view of a railway cutting on the Metropolitan Railway in two printings, black and tint half-tone (31×57 inches), a four-colour theatrical poster for the play "The Woman in the Case" ($38\times50\frac{1}{2}$ inches), a three-colour architectural view of Dublin Exhibition ($20\frac{1}{4}\times32$ inches), a four-colour poster for Mazawattee cocoa entitled "Britannia" ($16\frac{3}{4}\times26\frac{3}{4}$ inches), a four-colour of the "Dunottar Castle" steamship for Sir Henry S. Lunn ($17\frac{1}{4}\times26\frac{1}{4}$ inches), and a two-colour portrait of Ellaline Terriss ($25\frac{1}{2}\times36\frac{1}{2}$ inches). These prints certainly show the great possibilities of large blocks, and we shall not be surprised to see a more extended use of them by advertisers.

The work of Mr. R. E. Wilkinson, of Norwich, in producing large half-tones for lithography by means of enlarging is also deserving of mention. He has been very successful in this direction and numerous posters prepared by him have been printed in black and colours by Messrs. Jarrold & Co., of Norwich.

During the past year a process has been worked out for converting a bromide enlargement from a line or half-tone negative into a lithographic transfer. The method is based on the Bromoil process, which is well known to most photographers, and particulars have been published in "Process Work" to which our readers may be referred for details. We think that much greater use might be made by process workers of the projecting lantern, especially as some progress has been made in the direction of coating zinc plates with a sufficiently sensitive material for enlarging upon direct.

Electrotyping Progress.

Electrotyping is so largely bound up with photo-engraving, and any improvements made in the process will, therefore, be interesting. During the past year a method of depositing nickel steel has been worked out and used successfully in America, and is now also practised in this country, Messrs. Eyre & Spottiswoode being the first to introduce it here. An actual shell of nickel steel is deposited on the wax mould, and, of course, its wearing qualities in the finished plate are very much greater than copper.

Another improvement coming from America, though really a revival of our English invention, is a process of applying blacklead in a liquid state. We referred to this method in our last volume and gave some convincing examples,

showing how it is possible to make electros successively from one another without any apparent deterioration in quality. The process involves the use of a specially constructed machine for spraying the mould with the blackleading liquid, and the patent rights of this machine have been acquired by Penrose & Co., who will shortly put the machine on the market.

Mr. G. E. Dunton, an old contributor on electrotyping topics to our Annual, has invented a wax shaving machine with steam heated knife, which is likely to still further improve the electrotype mould. It leaves the wax case with a highly polished surface, so that "flaring" is rendered unnecessary.

The Pistonless Hydraulic Press is another invention of interest to electrotypers. It renders unnecessary the elaborate installations hitherto made for presses with hydraulic pumps. The press is simply connected to the ordinary hydraulic water mains and operated by turning on the water cock. Naturally the press is much less expensive than the ordinary hydraulic presses, and thus brings electrotyping within the means of firms who cannot afford the more elaborate plant. The press is also being applied to stereotyping with the addition of a steam-heated platen. Penrose & Co. are putting the press on the market

Stereotyping Processes.

Stereotyping methods, especially for newspaper work, have been greatly improved during the last year or two, and this has led to the largely increased use of illustrations. The method of facing the flong with a paste composition is now almost universally employed, and a new paste for this purpose is shortly to be introduced by Penrose & Co. It will have the advantage that the flong can be used ten minutes after coating, and there is no chance of the flong sticking or of the coating tearing off the flong.

One of the leading newspapers has introduced into its stereotyping department a machine for making flong—*i.e.*, for pasting the sheets together—superseding handwork and making a more uniform product.

Dry flong has begun to meet with some favour in this country. It is already largely used on the Continent. No doubt it has advantages for newspapers and for book work on type formes, but it will never do for half-tone illustrations. There is also a prejudice against it on account of the alleged rapid wearing of type through its use.

An ingenious process was brought under our notice recently for combining stereotyping and electrotyping. After the stereo matrix is formed it is made conductive by means of bronze powder, and after the back has been protected by means of some waterproof varnish the mould is hung in the depositing vat and a shell of copper deposited on it. The shell can be backed up in the ordinary stereo casting box.

Newspaper Illustrating.

It must be quite obvious even to the "man in the street" that immense progress has been made in the printing of half-tones in daily newspapers, and the work shown in such publications as the *Daily Mirror, Daily Graphic* and *Daily Sketch*, often reaches a very high standard of excellence. The organization of the staff of press photographers has been highly developed and illustrations appear in the press with marvellous quickness after any important event. The photographs are usually worked on by artists before being handled by the half-tone photographer and thus fuller contrast and detail is secured. The etching has been much improved by the use of etching machines, making the cuts better to stereotype and to print. Every newspaper seems ambitions now to possess its own engraving department, and there can be no doubt that the use of illustrations in our daily newspapers will be largely extended as time goes on.

Autochromes and their Reproduction on Paper.

(Continued from last Year's Annual.)

By HOWARD FARMER, Principal of the Polytechnic School of Photography.

HAPPY CHILDHOOD.

GARRATT AND ATKINSON. Photograph by F. W. TASSELL.

A FUNDAMENTAL difference which exists between autochromes and other coloured originals when employed as copies for colour work was referred to by me, under the above title, in last year's Annual.

The present article refers to further essential differences with a view to remove some misconceptions which exist, and describes in their most simple form the actual manipulations for reproducing autochromes as far as these manipulations differ from ordinary practice or require special attention.

Colour vision is generally explained, on the assumption of three sets of nerves, each set giving the sensation of one primary colour. If these or their practical equivalents actually exist in our retinas, it is difficult to conceive them performing their functions satisfactorily and without interfering with one another, unless they are side by side, so we must imagine them as forming a sort of mosaic. If this be so, the autochrome is a most beautiful replica of the retina in its essential elements, for in it we have a mosaic formed by three colours side by side, each representing one of the primaries. Again, in the autochrome this mosaic of primaries is in front of the sensitive film during exposure in the camera and carries its selective transmission to the photographic film behind, just as we may suppose the mosaic on the retina passes its selective impulses through to the brain.

As might be expected from this complete accord, we find the autochrome gives us the colour delicacies and gradations of nature, as seen with our eyes, together with her depths and contrasts. These qualities are very different from those possessed by the majority of works of art and other single reflecting surfaces which form nine-tenths of the coloured subjects the colour engraver attempts to reproduce; beyond flowers and fruit and such like subjects how rarely do we see nature recorded in natural colours, how rarely a portrait from life or a landscape. Some years ago the Editor, Mr. Gamble, was very much fascinated with the idea of taking screen negatives direct from nature It is quite easy to make a specimen block in this way by selecting the light or the subject, but we all in practice take an ordinary negative and transparency or print and send

Photographed direct from life

3 Colour Blocks by:

THE ANGLO ENGRAVING CO., LTD

14 Farringdon Avenue,

LONDON, E.C.

Also at GLASGOW,
MANCHESTER,
PARIS.

This Portrait Study from Life has been made by the Colour Photographic Process of the Dover Street Studios, London, W.

one or the other to the engraver. When dealing with autochromes it is exactly the same as when dealing with nature direct, and in the majority of cases it is necessary to take negatives from them before they can be satisfactorily reproduced. On the other hand, there is no necessity to employ the autochrome with works of art and similar subjects in which the colour effects are largely obtained by artifices which entirely suit the ordinary manipulations.

These remarks may explain why some photo-engravers have the feeling that autochromes are not of much help to them in their business or that they are not suitable for reproduction ; the homes and splendour of the autochrome are not the copy board and easel, but nature in her ever-changing colour moods or human expressions in their tenderest and most exquisite touches, these are fields of work practically untrodden by the colour engraver, fields which will be found by the men who first explore them "strewn with gold."

The main difficulties in the reproduction of autochromes can now be summed up as follows :—

1. *Structural texture.
2. Strong contrasts with high total differences. } As in
3. Extremely delicate local gradations. } nature.

The following are the manipulative details so far as they differ from ordinary work.

The colour filters will not be suitable unless each of the three primary filters will act upon the sensitive plate, only and exclusively through its analogue in the autochrome film. The special filters of Messrs. Wratten and Wainwright are absolutely reliable in this respect.

COURMAYEUR.

Photograph by DR. ENGLAND

DEAN ENGRAVING CO.

Negatives are first obtained in the transparency apparatus with each of the colour filters, using a diaphragm not smaller than is necessary for definition, and upon quick dry plates, *i.e.*, either dipped and backed speed plates or ready prepared and backed high-speed colour-sensitive dry plates (collodion emulsion is quite unsuitable for this work, although the best for some other classes of work). When held up to the light, with surrounding light excluded, the negatives must show the *whole* of the detail and gradations of the autochrome and be practically free from grain or grittiness ; the former is secured only by strict attention to correct exposure and development—the latter by the focussing and irradiation in the plates. From these negatives *screen transparencies* (on wet plates, if possible) are made of the size of the blocks required and also containing the whole of the detail and gradations of the negatives. This is ascertained by examining the plates over a dark ground as they come out of the copper bromide bath, and when they should appear as perfect positives. To attain success at this stage it is essential that the operator be thoroughly conversant with the resources

*Penrose's Annual, 1909-10, p. 161.

at his disposal in the screen and diaphragm adjustments. Finally dry plate screen negatives are made from the screen transparencies by placing the latter in contact with backed dry plates in the camera dark slide and exposing to an illuminated white surface (out of focus) through the lens. Care should be taken that the shadow dots of the transparencies are the right size to produce the proper high-light net work in the negatives.

In cases where it is necessary to retouch add or alter local colour, etc., the procedure is modified. The first negatives are taken either the same size or enlarged from the autochrome. From these negatives contact prints are made as follows—pieces of smooth bromide paper are dry mounted upon thin sheets of grained zinc or aluminium (in the dark-room, of course), and these mounted papers used in exactly the usual manner of bromide printing. It will be found they go through all the operations without loss of register, and when dry are worked up and screen negatives obtained in the usual manner.

SUNSHINE AND SHADOW.

EXPERT ENGRAVING CO.

Drawn by
W. GILLIARD.

An Offset Reversing Apparatus.

Marshall Studios.
Marshall Engraving Co.

IT is, of course, well known to those who have to deal with the lithographic offset press that it is necessary to have transfers the exact opposite of those hitherto employed, that is to say, as regards the inversion of any lettering or drawing so that it will look the right way when finally printed on paper. When new work has to be done it is easy to draw it in reverse, and as regards type matter the typefounders have endeavoured to meet the difficulty by casting type the wrong way about from the printer's point of view. Again, in the case of photo-process reproductions requirements can be easily met by taking the negative without the prism. But when we come to deal with existing work on plates and stones a difficulty arises. It would not pay to re-engrave or redraw such work, and the only method the lithographer knows of for reversing such work is the somewhat crude one of pulling a transfer on paper and running this through the press against another sheet of transfer paper so as to set off the impression from the first sheet on to the second. There must be risk of thickening the work by such a method, as well as the likelihood of trouble in register with colour work through the expansion or contraction of the paper which has to be damp and afterwards must be warmed to separate the two pieces.

These difficulties have been entirely met and overcome by Mr. G. H. Block, the well-known inventor of lithographic zinc and aluminium plates, who has designed for Messrs. Penrose & Co. a very simple patented apparatus for such reversing. He has adopted the very principle of the offset machine and embodied it in an apparatus for hand-press work.

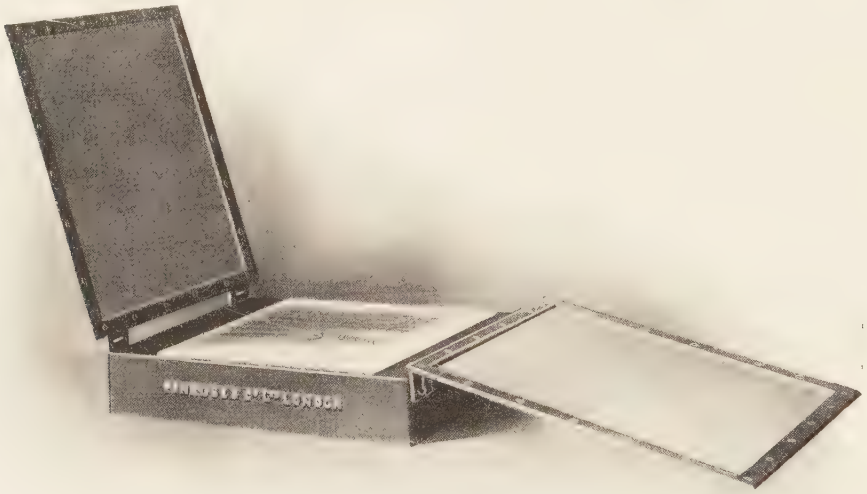
The original transfer or drawing is inked up in the usual manner and an impression is taken from it on a prepared film of india-rubber, or upon a specially prepared flexible composition surface. This reversed impression can then be retransferred to a suitable transfer paper, which in turn can be transferred to the zinc or aluminium plate to be put on the rotary machine.

Where a number of transfers have to be pulled from the same plate the apparatus has been provided with double film frames (as shown in the accompanying illustration). In this case an impression is taken on one of the hinged frames, then this frame is lifted, the plate inked, and the second frame laid down, with a piece of transfer on top coated side upwards. The frame carrying the impression first obtained is laid down on the transfer paper and the whole run through the presses. Thus a second impression is obtained whilst the first one is being transferred.

This method will save much time compared with the old one of stripping transfers, and much sharper results will be obtained. The work does not spread or "smash," as it was apt to do by the old methods.

Obviously anyone who wishes to practise offset printing on the hand press can do so with this apparatus, and obtain exactly the same results as are obtained on the expensive and cumbrous cylinder machines. The apparatus may thus prove very useful for proofing or experimental work, and short runs.

It may be added that by a slight modification of the apparatus it may be employed for taking impressions from lithographic stones, type formes and blocks.



Mr. Block anticipates being able shortly to produce an apparatus capable of printing on the roughest papers up to six feet by four feet dimensions without using any litho press or large machinery. Such an apparatus will be a boon to engineers, architects, surveyors, etc., for reproducing drawings true to scale.

A method has also been devised for obtaining by means of photography direct negative or positive prints on litho zinc and aluminium, without making a negative. All that is required is a tracing or drawing on almost any kind of paper commonly used.

Design and Block by L.C.C. School of Photo-Engraving.

CASSIOBURY PARK.

Printed on the "WAITE" ROTARY OFFSET PRESS
Manufactured by WAITE & SAVILLE, LTD - OTLEY, ENGLAND.
Printers :- UNWIN BROTHERS, LTD. 27, Pilgrim Street, E.C

Portrait of an Old Lady.

Rembrandt

Amsler & Skrein, Ltd.

C. Angerer & Göschl. *Photograph by H. Cl. Kosel.*

A Portrait Study.

Entwistle, Thorpe & Co.

Photograph by S. L. Coulthurst.

Old Caudebec.

Screen Negative on a Graphic Process Plate.

C. Angerer & Göschl. *Photograph by H. Cl. Kosel.*

The Quay Side.

De Reproductie Compagnie,
Rotterdam.

A Portrait Study.

ALLEN & CO. (London) Ltd. "Allezzogravure

BETWEEN TWO FIRES

From the Picture in the Tate Gallery, by F. D. MILLET.

The Passing Show.

By LOUIS FLADER.

KING'S COLLEGE CHAPEL, CAMBRIDGE.

PAWSON & BRAILSFORD. Photograph by E. W. JACKSON.

TO write a review of the year's events in the photo-engraving industry in this year of our Lord, 1910, is a bewildering task. It's a good deal like a form of entertainment quite popular in a number of pleasure resorts several years ago, called "Loop the loop." The pleasure seeker entered the car in company with three or four others, was strapped securely in his seat and shot down an incline. The tracks at the bottom of the incline curved upward and formed a complete circle; thus at one stage of the ride the occupants of the car were standing on their heads so to speak. The ride was a speedy one, to be sure, for sufficient momentum had to be obtained to whirl around the circle fast enough to keep the passengers from falling to the ground. No one was ever found who could remember anything but the start and the finish of the ride. The ride itself passed so quickly that there wasn't time to form an impression of it.

Events in the photo-engraving industry during the year have followed each other so fast that they resemble the blows of a pneumatic trip hammer, and it is difficult to say which particular blow struck the hardest. The offset press has them all by the ears. Great claims are made for it, and the majority of people up to this writing still regard it as everything under the sun except what it really is—a rapid lithographic printing method. Where it enters the realms of half-tone illustrations it possesses no advantage over flat-bed photo-lithographic work, excepting that it can be printed with greater speed; the nature of the work itself, if anything, is not equal to flat-bed photo-lithographic printing. This misconception has caused a number of type printers to install the offset press, and most of them find they have an elephant on their hands. The printer in possession of an offset press is forced into lithography. As a rule, he does not appreciate this fact until it is too late, then in order to realize upon his investment he stumbles along and does the best he can. This in most cases is not good enough. His efforts result in giving a black eye to illustrations in general and to offset-press work in particular.

Offset-press products emanating from lithographing houses thoroughly schooled in the art of lithography, show very good results and equal to stone work. Offset-press work will replace flat-bed lithographing to a great extent, if not in its entirety, but it will take some time for its users and the public in general to fit it into its proper place, which is not in the realms of half-tone illustrating.

Every printer in America in possession of an offset press gives its products a new-fangled name and adds confusion to an already complex situation. Thus we find two or three firms bidding on one order, each trying to out-talk the other,

all of them trying to fool the buyer that they alone possess a secret process, shared by no one else. Presumably in the end a uniform trade name will cover the process, and let it be soon. The photo-engraver has little to fear from the offset press, for while certain orders are deflected to it, we know of no case where one offset press job did not suffice for the buyer.

All of the foregoing applies to advertising literature which in America must be crisp, clean, bright, produced quickly and at reasonable prices.

The rotary photogravure process is undoubtedly making some progress, although just how much its promoters alone can tell. They perhaps won't. There are surely possibilities in this process, yet for commercial purposes it has not demonstrated its value to the public's satisfaction. While all of us at times deplore the mechanical ruling in the half-tone screen and its effect upon art subjects, particularly colour work, none of the present-day processes have presented us with anything better. Therefore, we are compelled to say, when speaking of half-tones, that "With all their faults, we love them still."

Printing and illustrating processes of this day and age must serve a useful commercial purpose or they cannot endure. The mere fact that certain artistic and hazy results can be obtained is nothing in favour of a new process. We all know that there are other ways to kill a cat besides choking it to death, but choking is a very effective method and surely accomplishes its purpose when properly applied.

Photo-engraving has improved through the skill of the engravers engaged in the industry. It has a wonderful influence upon literature, advertising and commercial pursuits. It has made the current magazines what they are, not only from an illustrative standpoint, but from a business standpoint as well. There are publications in America that charge $8.00 per agate line single column width, for their advertising space, $7,500 for a back cover page in colours and, would you believe it, their advertising space is oversold and the back cover must be bought a year in advance. Photo-engraving alone made this possible. The advertiser can *tell* his story and *illustrate* it, and that he recognises the value of illustrations is best proved by the fact that as high as $1,000 is paid for a drawing and plates used to embellish the $7,500 space.

Now that we have shown what photo-engraving does for others, let us see what it does for those who have their time and money invested in it. Speaking for the employers, a peculiar situation exists. Cheap work is cheaper than ever before and quality work costs more by the same token. The so-called "standard" prices can only be considered as applying to the medium grades of work. Speaking for the firm with which I am connected, the Barnes-Crosby Company, our experience during the past year has been that we could not secure enough highly skilled artists and craftsmen to fill the demand for quality work. This experience is shared by a number of the leading establishments of this country. The public demands good work and the demand is growing daily. It is true there is a great amount of inferior work manufactured and bought at ridiculously low prices, and in such cases it answers no real purpose and serves but as an excuse for what it should be. Improvements in inks, paper and press work are gradually educating the masses to a higher standard of illustrations. One publication, the "Ladies' Home Journal," recently advertised in its own pages and those of other magazines, asking artists of national reputation to create and produce fashion drawings and designs for them. Their advertisement stated that the highest prices would be paid, and when you take into consideration that the publishers spent perhaps $50,000 in merely trying to interest artists, you can plainly see the tendency of the times.

A great agitation is being carried on in the printing industry on this side of the water, to determine the cost of production. Engravers have caught the infection and some startling truths are being discovered. This is bound to wield a powerful influence toward the raising of prices, for it is only reasonable to presume that when a man knows it costs him a certain amount to manufacture an article, he will not sell it for less than cost. Employers are organizing throughout the country and while a number of previous attempts along this line have been made in various localities, all of them abortive, there is reason to believe that better success will attend their present endeavour.

Speaking of the present only, there are more men engaged in the photo-engraving industry to-day than ever before. The demand for photo-engravings is still growing. The worst sign of all is the number of small shops springing up almost over night as it were. What effect they will have upon the industry is a matter of conjecture. We may safely say that they will work more harm than good, for the simple reason that a skilled workman does not necessarily make a competent business man. It takes years of experience to equip a man for the game of business. This experience must be obtained by all who enter the arena. Experience must be paid for, and in this case photo-engravers will pay for it and the public will benefit by it. Experience will be bought through the medium of low prices, in most cases uncalled for by the buyer.

Since engravers have had a prosperous year, at least so far as volume of business is concerned, the Union has likewise prospered. Its treasury is assuming some proportions. The greatest difficulty confronting its officers is to devise ways and means to spend the money. The money is used in organizing, expanding to other lines of engraving and obtaining all that is possible in the way of wages and conditions up to purchasing the latter through strike benefits where necessary. While apparent harmony between the Union and employers exists, it is on the surface only. Below is surging an agitation and discontent on the part of employers, which sooner or later must break forth. The Union has been wise in the past in taking all they could get peacably. This has exaggerated the power of the Union in the minds of its members, and it's a case of a boy with a whip in his hand eager to crack it. The explosion will occur just as soon as employers are equally well organized, after that harmony out of chaos for a period.

On the Sands at Dovercourt.

London and Provincial Reproduction Co., Ltd.

Photograph by J. E. Tyler.

Filters.

By C. W. PERRY.

ROGIE.

PAWSON & BRAILSFORD. Photograph by W. J. BATES.

MOST operators usually think, when they are reproducing an original by the three-colour process, that they must always stick to the theory of using the usual filters to get the desired effect. Now, personally, I think this is wrong ; one must judge by the original before doing so. I know perfectly well there will be a good deal said about what I have written, but what is written below is my own experience, and I write it for the benefit of not only operators, but for etchers at the same time, as I know this method has saved a lot of tedious work to the last-named by dropping the theory of three-colour a little.

First let me explain. I am not writing about originals that have all the colours of the spectrum showing plainly, but of those which are of practically one colour, which would look much better if printed in one colour, but owing to that subject having to be printed with others on the same form a three-colour set has to be made of it, so that it can be run with the rest of the catalogue.

Recently I have had a large number of wall-paper designs for reproductions, and some were just faint grey designs, rather on the bluish-grey side. Now, here I had rather a difficult matter in getting anything to show at all, so great was the reduction, so being nearer blue than the other colours, I just made three blue plates, of course at the same time turning my screen. Now I should not have got the design to show at all in the ordinary yellow and red plates, and the etcher would have had to trace them in on these two plates.

Then, again, I have had some in a colour of a yellowish red ; for these I took two ordinary yellow plates and one blue. In some very faint green originals, I took all three yellow plates. Now even if there was not much red in the green design the etcher wanted the outline, and if I had taken a red negative none of it would have shown.

Lastly, I have had some originals with just a faint grey design, and the colours were composed of a mixture of Chinese white. Now these could not be obtained with either the red, green or blue filter, and the only way I could get the design to show at all was by taking three ordinary negatives through a quinine filter. Now if operators were to use their own judgment in regard to filters for such work as is mentioned above they would not only save time but get better results. When etchers have to trace work in, there is always some danger of going over the wrong place, then the finished result looks out of register.

John Swain & Son Ltd

From a water-colour drawing by G. Flemwell

"Autumn in Alpland."

On the Use of Flashlight Powders as an Artificial Light Source in Photography on Autochrome Plates.

By A. & L. LUMIÈRE and A. SEYEWETZ.

ENTWISTLE, THORPE & Co. Screen negative on a Graphic Process Plate.

The use of flashlight powders in photography on Autochrome Plates has been much developed of late, as this method of illumination has the important advantage of giving an intense light with a constant photogenic capacity and is adjustable according to the quantity of the powder burnt.

From the introduction of the Autochrome process, we had an idea of the possibility of using flashlight powders in cases where the ordinary daylight was insufficient, and we had established the formula for the screens to be used with different powders on the market, but the following considerations have prevented us from recommending this mode of illumination.

First of all, the variations produced in the temperature of combustion of the powder in accordance with its being more or less pressed into the cup of the flash lamp modify the emission spectrum, giving pictures of which the tonality presents slight differences.

On the other hand, the noise, the smoke and the heat resulting from the deflagration were the regrettable consequences of the indispensable use of a strong powder charge. Further, the rather high price of a strong charge of powder was still another obstacle to the utilization of this method of artificial illumination.

These considerations, which made us hesitate to recommend these flashlight powders, have not stopped other experimenters, Messrs. Montpillard and d'Osmond, who have indeed been the first in bringing on to the market a screen and a powder* which can be used with Autochrome plates.

The way in which the " Ideal " powder of Osmond, and the " Auto P.O." of Montpillard has been received by the public have shown us that our hesitation was not sufficiently justified.

In principle, all powders can be used for photography on Autochrome plates, but with each one a corresponding special screen has to be employed, as the spectrum of the light emitted by the powder in combustion varies according to the metal and the oxidizer used. All powders with a basis of magnesium, whatever be the oxidizer employed, produce a light much less rich in blue and violet radiations than the rays of the sun ; therefore, if they are used with the screen employed

* Flash powder "Ideal," and screen Auto P.O. "Bulletin de la Sté. Française de Photographie," 1909, page 203.

for daylight images are obtained giving a prominent yellow orange, which is more or less pronounced.

Notwithstanding numerous trials it has not been found possible so far to incorporate with the magnesium certain substances, capable of enriching the flame of the powders sufficiently with blue and violet radiations to allow the same screen to be used with these powders as when using daylight. The oxidizer, even when used in as large a quantity as possible, cannot modify the spectrum of the flame of the magnesium sufficiently to arrive at the result sought for.

We have, however, arrived at the solution of the problem in an indirect way, by burning the powder in an apparatus constituted with an enclosed space, which communicates only at the top with a chimney. The back of this apparatus through which passes the active light is provided with a translucent paper (papier crystal), which serves for diffusing the light and which is tinted a violet blue in a tone exactly complementary to that constituting the dominant one of the plate obtained with the ordinary screen.

With this arrangement it is, therefore, possible to use simultaneously daylight and flashlight, using the latter as a supplementary illumination to daylight, in case this should be insufficient.

This process which is very attractive in principle, presents many difficulties in practical use. It is, in fact, necessary, in order not to lose too much light, to give to the diffuser a very large surface. The paper forming this diffuser must be tinted quite uniformly, which, however, it is difficult to attain on a large surface. Further, the colour, which must be rigorously determined, is also difficult to match with that of the special screen. The result is only attained after much trial and one is never sure on account of the insufficient constancy of the colouring matter, of obtaining from one paper to another two diffusers of which the tints are absolutely the same.

Also, the chemical and calorific radiations working upon the diffusers at each combustion exercise rather quickly a discolouring action upon the same.

Once we can arrive at a remedy for these inconveniences, which does not seem at first sight impossible, it will be an easy matter to deal with cases where the daylight is of insufficient intensity.

The conditions which had to be overcome up to now in applying powders used for ordinary photography, such as the suppression of fumes as much as possible, the smell and the noise of the combustion products, are only a minor matter in photography on Autochrome plates, as the large quantity of powder used makes the mitigation of these inconveniences more or less superfluous.

It seems more rational to concentrate one's mind more especially upon the preparation of a powder with a large photogenic capacity in order to lessen as much as possible the quantity of powder which is necessary.

This diminution of the quantity of powder is, after all, a means of lessening the inconveniences described above.

If. then, one leaves out of consideration the desiderata which have been sought to be realized hitherto in the ordinary flash powders, and only considers the photogenic capacity, it is necessary to choose those oxidizers which, in the smallest proportions, will produce the complete combustion as quickly as possible of the largest quantity of magnesium.

It is further imperative, as it is necessary to employ heavy charges of powder, that the oxidizer be as stable as possible, and must not expose the operator, as does chlorate of potash, to the danger of spontaneous explosions which have been, as is well known, the cause of frequent accidents.

Perchlorate of potash seems to be in this respect the best obtainable substance.

This very stable substance is in fact a very energetic oxidizer which can be used to advantage either with magnesium or aluminium.

The mixtures of aluminium or magnesium and perchlorate of potash resist the action of the shock, whereas if the chlorate is used the mixture detonates violently through the shock.

The sulphuric acid, which decomposes the chlorate with explosion, whilst the temperature rises, acts only with difficulty upon perchlorate, even if warm.

This stability permits, therefore, the safe use of the powders with perchlorate of potash.

A powder is obtained which possesses a very great actinic power and burns very quickly with the following mixture :—

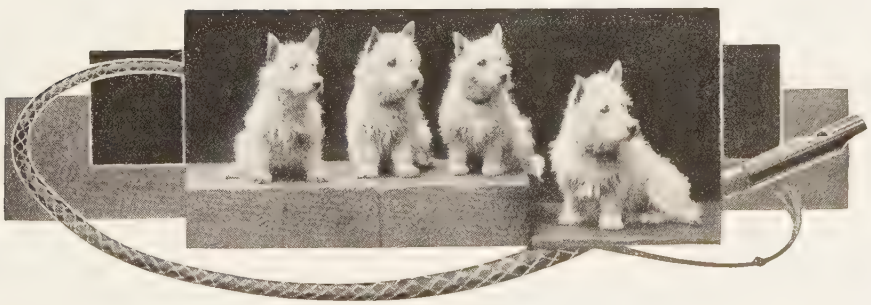
Magnesium in powder (sifted through sieve 120) ..... 2 parts.
Perchlorate of potash (,, ,, ,,) ..... 1 part.

Mix with a card the two ingredients.

Magnesium can be substituted by aluminium, but the metal must necessarily be in impalpable powder, without which the ignition becomes very difficult.

The degree of fineness of the aluminium must be such that the metal adheres easily to the vessels in which it is contained, forming a brilliant layer.

With each of these powders screens are used of a greenish yellow.



On the Alert

British Photo Engraving Co.

Photograph by T. Fall.

The Enclosed Arc.

By W. J. BATES.

When we replaced open arcs by enclosed ones I was rather sceptical with regard to the great advantages claimed for them, and determined to carry out a series of experiments as to their influence on time and copy.

I found that instead of having to give from ten to fifteen minutes as formerly, my exposures were cut down considerably, varying from three-quarters of a minute to five minutes, according to copy and reduction, in the case of half-tones and only a matter of seconds with line work. Now that was very satisfactory, but trouble soon arose when we had to deal with worked-up photographs and wash drawings. The artists would use Chinese white (it worked smooth and lined up nicely, was their excuse) and bluish washes. The Chinese white photographed a decided tint, and the lovely "washes" (to look at) vanished; the atmosphere of the etching-room thickened and I had to pour oil on the troubled waters. Now these are all things of the past, as the card and colour makers have risen to the occasion, and suitable materials are to be had to meet the change in lighting.

The accompanying photograph was taken for the purpose of demonstrating the actinic value of the enclosed arc, and shows how very rich in violet rays (the most useful to the process man) they are. The exposure was made at 6 p.m. in the month of January on a special rapid plate 1½ seconds at *f* 16, normal pyro-soda developer, and shows a complete reversal in the direct light of the lamp, the copy-board being white instead of black, and the original on the board has almost disappeared. There was no "flash" or other light used, the diffused light from the ceiling being sufficient for the surrounding detail.

By hanging a couple of sheets of white tissue paper before the lamp to diffuse the light small articles can be photographed in winter or at night, and silver or P.O.P. prints can be got off to time. Besides being useful in that way there is the consideration of their very low cost of running, as they use very little carbon and a high voltage with a low ampèrage.

Wallage & Gilbett, Ltd. *Photograph by Reinhold Thiele.*

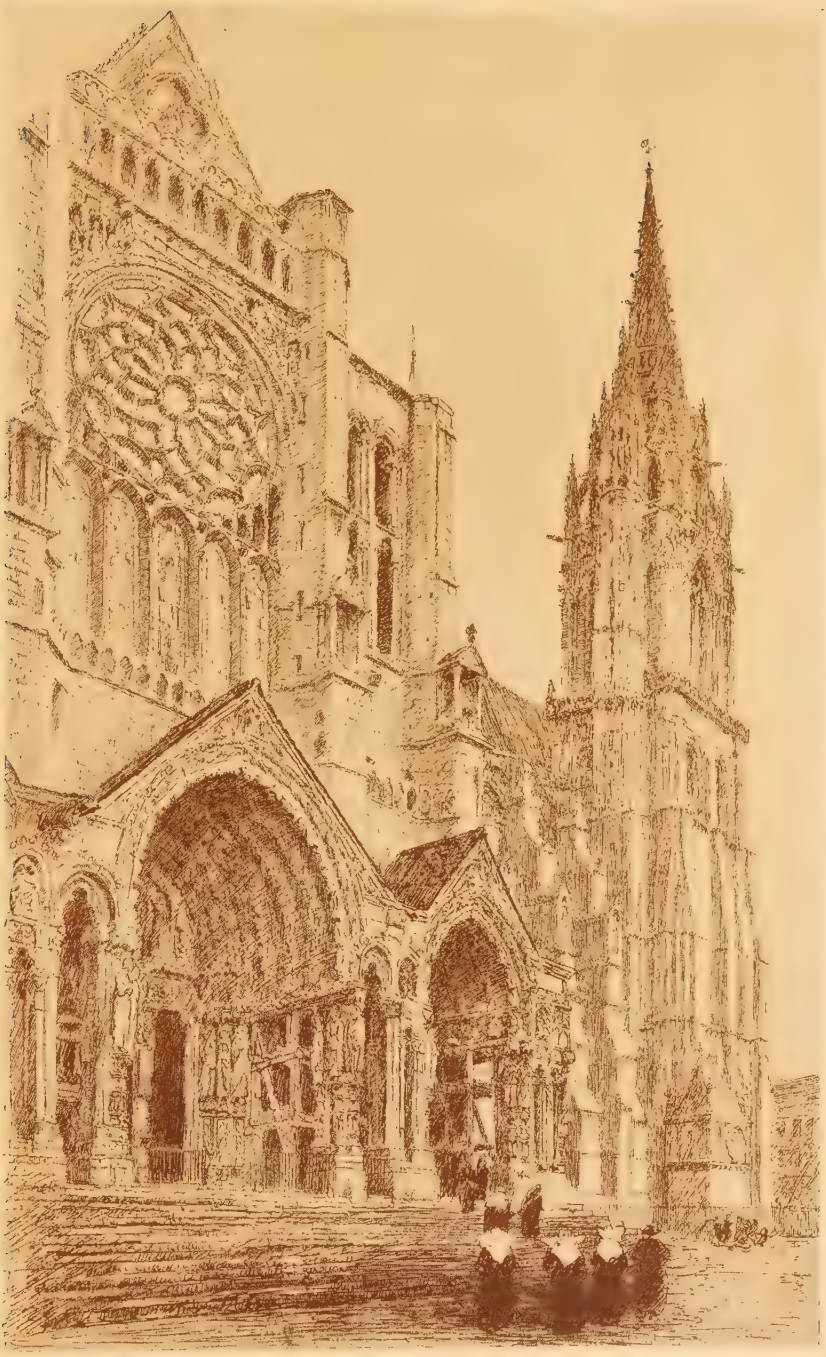
Evie Greene.

A. E. Dent & Co., Ltd.

Photographs and Design by E. W. Jackson.

Some Cambridge College, Bridges.

1. Queen's College.
2. The Old Bridge, St. John's College.
3. King's College.
4. Trinity College.
5. Clare College.
7. Bridge of Sighs, St. John's College.
6. Garrett Hostel Bridge.



Arc Engraving Co. *Drawn by Hanslip Fletcher.*

Chartres Cathedral, West Front.

Swan Electric Engraving Co., Ltd.

Photograph by Elwin Neame.

Portrait Study.

So-called "Nickel-Steel Electrotypes."

By GEORGE E. DUNTON.

MISCHIEF.

PAWSON & BRAILSFORD. Photograph by W. J. BATES.

BY the advent of the process of the deposition of the so-called "Nickel-steel" shells and the production of the "Indestructible hard steel electrotypes" quite a furore has been created in the electrotyping industries throughout the city of New York, and it will no doubt have its effect all over America, possibly reaching the other side of the ocean. Many printers are demanding the so-called "steel electro," even though they anticipate printing only a limited number of copies from the plates. Unless there is an advance in prices charged for this work, over that of the ordinary copper electro, it will sooner or later work to the damage of the business, in which the percentage of profit is small enough and competition is very keen. Five cents per square inch is little enough for this kind of plate, to produce which the anodes cost three times as much as copper, the sulphate of the metal is three or even four times more expensive than copper, and the entire process requires much more time and attention than the making of the common copper electros.

The creators of the so-called "steel electrotypes" started in business with the intention, or at least that was what they advertised, of charging four cents per square inch. There are several competing firms already in the field. I am informed that one of them has started in to do work at two cents per square inch, and the Lord only knows how much less than that some of the others will furnish these plates for, probably whatever price the printer may demand rather than lose his work.

There is no doubt but what these so-called "steel" electrotypes will outwear many of the copper electrotypes, simply because it is not always the hardest (deposited) copper that is the toughest or that will wear the longest. Neither will the hardest deposits of nickel wear the longest. There is no doubt or contention but what nickel properly deposited will outwear the most reguline deposited copper, and a nickel alloy combining some other metal element to toughen rather than harden the nickel will prove a valuable composition for making electrotype plates for printing purposes, where very large runs are to be taken into consideration solely. For printing qualities or sharpness the copper electrotype is fully equal to any competitor. We have seen electrotype plates, from which one million, two hundred and fifty thousand copies had been run, and the plates were at that time in good, printing condition, because the copper was of a tough reguline texture and the plates were handled right in the making ready and the printing.

The so-called "steel" or "nickel-steel" electros are neither steel nor nickel and steel, because steel is a carbonized iron, iron impregnated, or which has

absorbed from 0·7 to 2 per cent. of carbon, or a cast iron in which the percentage of carbon has been reduced to from 2 to 0·7 per cent. Carbon cannot be deposited in the electrolytic bath because it does not possess the property of replacing hydrogen of an acid in the formation of salts. (Watt's Dictionary of Chemistry, Vol, 3, page 683). For this reason it could not pass from the anode into a component element of the bath and be deposited at the cathode. We feel satisfied that this disposes of the steel part both by itself and in combination with nickel.

Several of the electrotypers have come out and told the truth about the matter, claiming simply a " hard nickel " electro or a hard nickel alloy, which is much better. This alloy is a combination of nickel and iron, deposited probably by the addition of iron sulphate to the nickel bath in a small percentage, together with oxalic acid or oxalate of iron (?)

I do not wish to convey the idea by making the statement that " steel cannot be deposited," that iron cannot be, for it is possible to deposit a grade of iron so fine and tough that in appearance it is brighter and whiter than steel and possesses superior wearing qualities. Iron is extremely troublesome to deposit, however, for any considerable time, on account of the avidity of the solution of iron sulphate for oxygen and the consequent rapid absorption of oxygen from the atmosphere when the solution has stood for some time in contact with the air. Some of the earlier operators covered the top of their baths with a layer, or film, of paraffin or light paraffin oil to keep the air from coming in contact with the solution.

Alexander Watt says in his work on electro deposition, page 531, that " After having tried a considerable number of baths prepared from various salts of iron, and worked at different degrees of strength, it was found that weaker solutions almost invariably yielded more uniform results than stronger ones." It is further evident from reading the results of Watt's experiments with the deposition of iron, that the simpler—nearer to the simple sulphate and a very small percentage of an acid of some kind—the solution was made the more satisfactory the deposit obtained would be. There is no doubt as to the successful possibility of depositing a very hard iron ; there is some doubt as to the eternal continuation of conditions which will give precisely the desired deposit, for some times the solution will undergo apparently a complete physical change overnight, and there will be either no deposit at all or a black powder thrown down in the place of metal. It is then better to make a new solution and start in fresh.

What Watt has said of the composition and working of iron baths, I have found to be true with respect to nickel baths, that " the simpler the composition of the bath the better the results obtained, and that the weaker solutions yielded not only more uniform results, but more satisfactory qualities of deposited nickel." My best experimental deposits of nickel were produced in a bath of the single salts, or acid salts, of nickel without the ammonium. The solution stood at four degrees Beaumé, and I used from 1—1½ volts from my battery for electrical energy. Some of the nickel was pure white and ¼ inch in thickness. Electrical energy was derived from a battery of " crow foot " cells and the electro-motive force was kept between 1—1½ volts. Energy was maintained constant, without stoppage or interruption during the entire period of deposition. There is a peculiar condition attending the deposition of nickel. " Whenever the electrical energy is interrupted, by opening the electrical circuit, the deposit will be found to lack homogeneity." At or with each interruption, a layer of metal is completed and another layer independent of it forms over it, while there is adhesion between the layers there is distinction, or, in other words, the metal is homologous, but the deposit is not homogenous. It follows then, that there must be no stoppage of the " current " while deposition is in progress or until

completion of the deposit, neither should the mould be removed and kept out of the bath for too great a period of time at one and the same interval, or the deposit is liable to form a distinctively new layer. The fingers should never touch the surface of the deposit.

Nickel is a troublesome metal to deposit, because conditions surrounding its electrolytic production are so exacting and the slightest deviation results in failure. The metal is a white, hard, malleable, *magnetic* metal, frequently associated with cobalt and iron and containing the latter metals as impurities in combination. The main contributory cause for failure in the deposition of nickel is the composition of the bath. Some platers or electrotypers imagine that the greater assortment of chemicals they can scrape together and dump into a bath the more scientific they are becoming, while in matter of fact, as I have stated, "the simpler the composition of the bath the better the results obtained," while the weaker solutions and lower electrical energy give better deposits of not only nickel but the alloy of nickel-iron. The nickel bath becomes saturated, that is, no more sulphate will dissolve before the hydrometer (Beaumé) indicates seven degrees, or at between $4\frac{1}{2}$ and 5 degrees; notwithstanding this fact I have seen in a certain work on "Electro-deposition of Metals," the name of which I will not mention, that "in making up the nickel bath, dissolve the double salts of nickel and ammonium in water until the hydrometer registers 7 degrees." In America, at least, where the make of hydrometer is not stipulated, it is the practice to assume that the Beaumé scale is taken as a basis, for this is the hydrometer universally used. The cause of this ambiguous formulation is apparent to those who have read or devoted study to the deposition of metals. The careless appropriation from the writings of others and the interpolation of these plagiarized quotations as their own creations is responsible for such inaccurate data. Turning to page 115 of "Electrotyping," by Urquhart, relating to "nickel solutions," we find the following: "The depositing solution may also be prepared from the double salt as obtained in commerce." "In either case dissolve the compound in hot water to saturation;

"A DISTANT MOUNTAIN'S HEAD
WHICH, STREWN WITH SNOW, . .
SHINES LIKE ANOTHER SUN."
— *Wordsworth.*

W. MATE & SONS.

afterwards dilute with water until a *Twaddell's hydrometer* indicates a density of seven degrees ; or simply dissolve three-fourths of a pound to each gallon of water." Herein comes the trouble. There is as much difference between a "Twaddell's" hydrometer and a "Beaumé" hydrometer as there is between a chafing dish and a stew pan, for 7 degrees on the Twaddell's scale represents $4\frac{4}{5}$ degrees on the Beaumé scale. It is too apparent where such a misleading statement, unqualified, would land an uninitiated devotee.

Much may be, and should be, read on the subject of the deposition of not only nickel, but metals in general from the books by Alexander Watt, Dr. Langbein, Urquhart, and electro-chemistry by Gore, although I do not believe that the majority of the formulæ are possible in practice. That has been my experience with those that I have tried out ; the results have been very disappointing and are the reason for my statement "that the simpler the depositing solution, the more satisfactory the results will be." The addition of some of the organic acids to the nickel bath have, or serve no apparent purpose whatever in the electrolytic action which takes place in the electrolyte. Even with the double sulphate of nickel and ammonium, I believe that unless the cathode is some metal which is liable to be attacked by a hydrogen acid and redissolved, or the deposit is liable to be redissolved, the presence of ammonium in the bath is a hindrance to the deposition of metal, because instead of a metal appearing at the cathode as a result of the dissolution of the ammonium sulphate, hydrogen and free ammonia (alkali) appear at this point. In the deposition of nickel on wax, at least, this value of ammonium sulphate might be better represented by the simple sulphate of nickel plus a very small percentage of sulphuric acid, if it is deemed that the quickening effects of an acid are necessary in the electrolyte. I believe that the presence of a very small amount of hydrogen acid is beneficial in these baths. Each element of which sulphuric acid is composed at least plays an important part in the electrolytic action which takes place, but the acid should not constitute more than one-fifth of one per cent of the hydrometer scaling of the bath.

Many of the ingredients which find their way into the composition of the plating bath are not accountable for their being there, no plausible excuse can be offered for their addition, and it can only be charged to accident, which is very vividly set forth by a little incident which I hope to be pardoned (possibly forgiven) for relating. A certain workman was facing electrotypes with a certain metal, not steel, and was having some trouble with the deposit coming porous. In his despair he sat down beside the tank and started to clean an old straw hat with oxalic acid, by some, in this case as it turned out, fortunate accident, the package of oxalic acid was brushed off the edge of the tank (just think how extremely careless he was to have his package in such an exposed place), and went into the solution, sinking beneath the green surface of the liquid. But the result (he says) was almost miraculous ; the facings came out without any more porosity and he has had no further trouble since. Just what function oxalic acid would perform in the plating bath I do not know, only that its two atoms of hydrogen can be replaced by equivalent atoms of a metal in the chemical transfer which takes place within the bath thus to a very limited degree, aiding in the promotion of electrolytic action, but, on the other hand, the affinity of this acid for or toward the metallic oxides in the formation of oxalates of the metal of the oxide, would seem to me to preclude the use of this acid as an aid to the electrolytic deposition of metals. But this operator swears by oxalic acid, both for cleaning straw hats and as a valuable adjunct to the deposition of certain metals (not steel). I have devoted considerable time to experimenting with straight nickel baths having an addition of a few of the organic acids recommended by the different works on

"Electro-deposition," citric, benzoic, boric and phosphoric, but my results were always better by their omission than with their admission as well as the ammonium sulphate.

If the so-called nickel-steel depositing sham has not been already pretty well deflated, there is little doubt in my mind but what it will be after a few of the electrotypers have let the pigs out of their purchase bags and seen what they have in reality bought. If there is really a demand for electros of a harder surface metal than straight nickel, then the addition or incorporation with the nickel of possibly iron into a deposited shell may prove an advantage, if the electrotyper can secure a proportionate advance for the price of his work, which is doubtful. Its introduction, the so-called "steel-electro," first savoured too much of the "get-rich-quick" schemes which have been so widely launched in America. In reaching a final conclusion to enter into the manufacture of the nickel-iron electros, the electrotyper should consider the fact that the trimming of these plates will be very severe on the cutting edges of all his trimming knives and cutters. The only cutters that can withstand this alloy are of the so-called self-hardening-steel, and it soon batters down the edges of cutters made from this material. The frequent sharpening and replacing of these tools means quite a good bit of expense and attention. On the other hand, the care and attention which a bath for the deposition of an alloy requires must be carefully considered, especially where iron sulphate is one of the elements. As before alluded to, this salt in solution readily becomes oxidized from contact with the atmosphere, giving the operator considerable annoyance.

The Open Window.

Design and Block by Philipson, Son & Skilleter. Photograph by F. W. Tassell.

In making up the solution for nickel-iron alloy secure the so-called single salts or nickel sulphate, Ni S O4 and the common sulphate of iron, Fe S O4. Mix the two sulphates in the proportion of three of the nickel to one of the iron, before dissolving in the water. Dissolve the mixed salts in hot water to saturation, that is until the water will dissolve no more of the salts. Do not fill the tank more than three-fourths full of water, because the strength or density of the liquid must be reduced as soon as it cools down to as near 60 degrees Fahrenheit (the common thermometer scale) as conditions will permit bringing it. With reference to the water, it might have been better to have suggested warm water instead of hot, for it should not be heated to more than 120 degrees F., and during the dissolution of the sulphate, tried at intervals with the hydrometer (Beaumé); when the scale shows five degrees above the top of the liquid, remove the un-

dissolved sulphate and allow the solution to cool, forcing it down to 60 degrees F. Add sufficient cold (at 60 degrees F.) water to bring the hydrometer down one degree, to four. The anodes, which should be the best grain, cast nickel, may now be hung in and the solution tried out. Start in with one-half and gradually increase to one volt, carefully noting results and tabulating same in a note book. As the bath warms up a little the hydrometer will settle a little below the four degrees and gradually rise as the solution cools down again. The change may be so slight that the ordinary practitioner would fail to observe it, as it would be only from $\frac{1}{10}$th to $\frac{3}{10}$ths of a degree in a rise and fall of temperature of from 30 to 40 degrees F. If sulphuric acid is added to this bath, it should be very, very cautiously, not over a drachm at a time, and results very carefully noted after each addition, for with a solution as near the point of saturation and of such an extremely short working range it is a very easy matter to overdo. The current must not be carried to the point of producing free hydrogen at the cathode and the bath must be agitated, not necessarily violently, but sufficiently to keep hydrogen from collecting over the surface of the mould. The weaker the current, the whiter will be the deposit of nickel, and at the same time the harder and the greater its tendency to curl up at the edges of the shell as it begins to thicken.

To prevent the shells from curling at the edges and leaving the wax, the concerns using this process are resorting to a form of connecting the mould (surface of the mould) to the metallic case, which I was taught when an apprentice boy, thirty years ago. The connections are scraped or dug through the wax to the case, around the four sides of the work, thus holding the edges of the shell firmly or fastening them down to the wax. The back of the case is " painted " or stopped out with hot wax painted over it with a brush. The connection hole in the case is made bright, and the mould is suspended from the battery rod by an ordinary "S" hook. By this method and in this bath shells of solid nickel-iron alloy can be deposited heavy enough to back up without the usual reinforcement of copper.

There is only one real advantage in the nickel-iron alloy electro for very long runs on the printing presses, especially of the cylinder types, there is no question but that these shells will outwear the copper, we must all concede that point. On the other hand, for fine printing or for coloured inks the copper is as good as the nickel-iron alloy. Coloured inks are now compounded without the oxides which formerly attacked copper, and unless the mould from which the shell is made is perfect it matters little what metal is deposited over the surface of the wax, the reproduction cannot be better than the mould. The great secret of success in plate making, lies not in the kind of metal we are able to deposit, but in the making, and the subsequent treatment of the mould between the pressing and its going into the bath, as well as in the formulating of the moulding composition. We will reserve this topic for consideration at some other time.

Should the electrotyper have one of these so-called " hard alloy " shells he can readily determine the presence of iron in the alloy by a few simple tests which any and every electrotyper can perform easily and quickly.

Holding a piece of the shell up to the pole of a dynamo does not show the presence of iron with nickel, because the nickel in itself is slightly magnetic and will be attracted to the poles of a dynamo or magnet.

Place a few fine strips cut from the suspected shell in a test tube, filling the tube about half full of a 25 per cent. solution of sulphuric acid, to which has been added five or ten drops of nitric acid. Place the tube over the flame from a Bunsen gas burner and boil the mixture very carefully, until the strips of shell have all dissolved, when a greenish coloured liquid will result. Do not allow

the boiling to become violent, for the liquid is liable to spurt out of the tube, doing injury to whatever it comes in contact with, and be very, very careful never to get your face within range of the opening of the tube during the process of boiling. Upon evaporation to dryness, this green liquid will yield nickel sulphate, or if it it is an alloy of nickel and iron, a double sulphate of nickel and iron.

To test this liquid for the presence of iron, provide three test tubes, filling each about half full of distilled water. Add to the water in each tube five drops of the green solution.

To the first tube add, drop by drop, ten drops of potassium sulphocyanide test solution. If iron is present, in any quantity, the liquid will immediately turn to a deep blood-red colour. If there is only the slightest trace of iron as an impurity in the nickel its presence will be indicated, but the liquid will take on only a very slight reddish-brown tinge. This is a very delicate test, sensitive to the presence or indication of iron. The colouration is not permanent, soon fading.

To the second test tube add, as before, ten drops of potassium ferrocyanide test solution. If iron is present, the liquid will turn a light greenish blue, rapidly turning to a darker blue at the surface. If iron alone is present there will be no precipitate at the bottom of the tube. If nickel is present, there will be an apple or light green-coloured precipitate form in the bottom of the tube. If both iron and nickel are present both conditions will result, the greenish-blue coloured liquid above the middle of the tube and the apple-green coloured precipitate at the bottom of the tube. This test should be carefully made and watched very closely.

To the third test tube add, as before, ten drops of a potassium ferricyanide test solution. If iron is present, a rich deep blue solution will result (Prussian blue), stronger in colour at the surface of the liquid, where it comes in contact with the air. If nickel alone is present, a brownish-yellow precipitate will form in the bottom of the tube. If both iron and nickel are present, both results will appear, each in proportion to the percentage of the respective metal in the shell.

Repeat these tests, substituting what is supposed to be pure nickel (granulated or grained), and note if there is any iron present, comparing results. Then draw your own conclusions.

NOTE.—These tests are taken by the writer from his "Electrotyping Brochure Series, Book 1," which is copyrighted both in Great Britain and America, all rights being reserved.

DAISIES.

Photograph by W. J. BATES.

Improving the Screen Effect in Three-Colour Work.

By A. DAWSON.

A Child Study.

Photograph by
E. Hamel & Co. Freckleton & Co.

THE "Grille" of the three-colour picture as now produced is susceptible of much improvement as viewed from the artist's standpoint.

Doubtless the technical department reasons that the colours should correctly have an equal chance of prominence.

But viewed properly, this is a mistake, and it is to be regretted from the artist's standpoint that Levy screens ruled to imitate the lines of canvas—that is, square to the sides—are not more common. It is quite sufficient to tilt a copy, say, one inch in six or eight to prevent the disagreeable effect on upright lines. But the other colours at fixed angles I would propose to do away with by using one of the new Metzograph screens, leaving only the blue for the square-ruled screen. Or if four colours, then the final neutral alone to have the ruled screen.

I see in the Annual of 1908-9 this matter is referred to, but it was too early to give it a proper trial—and since then the transparent Metzograph screen is far better produced and understood—but the idea of condemning a mixed screen effect simply because it is not a single process or texture throughout is, I feel, wrong.

Of course, on this plan the position angles are no more a trouble and it enables a larger picture to be produced with the same camera.

Careful observation will enable an operator to note which number of mezzo screen will suit colours best for *truth in the lighter tints*—where fine etching is so much called for, especially if the grain or ruling is very fine—and to meet this I fancy Nos. 3 or 4 mezzo screens will be found to work truest, while for the Levy, a close one about 160 or 175 might suit. If the final printing is a grey and not a blue it could be 200—but usually the colour ratios would be more true with a screen under 150—which, being worked canvas like, will please the eye even if quite coarse, say 100.

Half-Tone Engraving Co., Ltd.

Photograph by J. A. Sargent.

After Politics.

E. Hamel & Co.

Photograph by Freckleton & Co.

Under Sail.

Lascelles & Co., Ltd.

Photograph by West & Sons.

In the Solent.

A. E. Dent & Co., Ltd

Photograph by John A. Southwart.

Sup. Lad!

Electro-Tint Engraving Co., Philadelphia.

A Matinée Hat.

About Photo-Engraving Prices.

By HAROLD HOOD, F.R.P.S.

AMALGAMATED PRESS, LTD. Photograph by M. R. BRODIE.

HEAD OF BUTTERMERE.

I REMEMBER the Editor of "Process Work" some years ago, in an article summarizing the question of price cutting, ending up by some such consolation and encouragement as the following :—

"Well, it is not much good expecting to raise prices by bewailing their lowness, and, after all, with proper plant and good organization there is still money to be made on half-tone blocks at 10d. per square inch."

It is not my lot, nor hardly anybody's, professional men excepted, to be really intimate with many other businesses than one's own ; yet, in nine cases out of ten, don't you find in such concerns as you do know a little about, that things always are worse than they have ever been ? As an engraver, don't you wish, for example, that you had those tenpenny days back again ?—worrying and difficult days though they seemed then. In these worst of all times one considers it a fairly good stroke of luck to obtain a contract at one-half, or even less than half, the prices prevailing in the "tenpenny days" for similar work.

Does it ever occur to you that it is not in the least impossible that, within the next decade, twopence-halfpenny may be the top price for half-tones ? The advertisements of a few small, but mischievous, firms (and one or two big mischievous ones) show my rather depressing proposition to be not improbable.

The pessimism evident in Mr. Gamble's editorial in last year's "Process Year Book" leads me to think it is unlikely that that gentleman would now say, as he said not so many years since, that there is still "money to be made" on half-tone blocks, using the phrase in the same pleasant sense formerly meant. Because, with few exceptions, money is *not* being made in ordinary line and half-tone. Almost the very nature of the photo-engraving business is against its ever being of the strong money-making order—it is all so mysterious to the rank outsider, so pretty in its processes and so intensely attractive in its products, that these things attract rather than the earning aspect.

Having the ranks of engravers thus swollen, there is the all-important (?) need for turnover, with the consequent utterly illogical cutting of prices—so illogical that it simply needs a prospective customer to say to Brown's traveller—"Oh, I can get good half-tones from Robinson at 6½d.," when the traveller (he *must* have turnover) at once responds, "Well, I will do them at 6d." Since it is probable that Jones's traveller does just the same, you get the square-inch-price stone continually rolling down the bottomless slope !

The traveller is not wholly to blame—the customer naturally wants the bottomest price ; some employers are not to blame—the sort who are in business

not for turnover but for profit. The trade as a whole has only one serious enemy—itself, individually and collectively.

In my own way, I may possibly be taken as a typical member of the trade. I have followed with interest Benedict's American half-tone figures; yet it would be commercial suicide if I, alone, tried to apply any such figures to my own business. I try to do the best work possible with any given material, and insist that those with me shall do the same. I maintain average prices so long as I dare. When, however, I find that turnover persistently drops for a prolonged period, I know it is not my work which is suffering and causing the dropped turnover; on the contrary, my work has always shown gradual improvement and has compared well with the current work of competitors, if it has not excelled it. From various evidences I realize that other good engravers are coming down in price. Must I then heroically suffer a martyrdom of lost business, or wickedly and illogically "cut"?

I "*cut*."

I would prefer to do 5000 blocks per annum at 6d. per square inch rather than five blocks at £5 per square inch. And as I would prefer to do 5000 blocks at 6d. per square inch rather than 100 at 6½d., I "cut." So does Brown; so do Jones and Robinson—and we shall all continue to do so until we are either all ruined or until the existing Photo-engravers' Association sends out impartial accountant missionaries, skilled in some simple financial "system" capable of showing each individual firm what *his* blocks do cost. But that system *must* be simple.

But even that won't change the weakness of human nature latent in every photo-engraver, be his knowledge of costs ever so perfect.

And that's the rub!

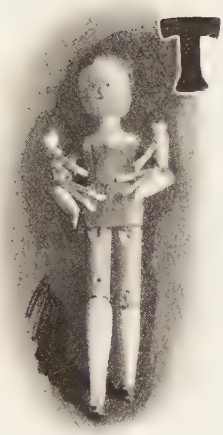
Isle of Capri, off Naples.

Gilchrist Bros.

Photograph by C. S. Best.

Colour Portraiture by Collotype.

By S. G YERBURY.



In Doll Land.

Amalgamated Press, Ltd. (Process Dept.) Photograph by K. F. Bishop.

THE interesting feature of the advent of Autochromes, to my mind. has been the strong desire, everywhere expressed, to see the same class of image on paper. A considerable increase in colour collotype has taken place recently which is probably a sort of response to this desire. These collotypes are usually copies of paintings of fairly large size, which require only one negative for each colour plate. The cost of one small portrait by this means would be prohibitive, but it is quite possible to combine a number of glass negatives to print on one collotype plate and to register the remaining sets of negatives for succeeding plates.

Before explaining how this may be done, a few words on colour portrait negatives may not be out of place. The camera, stand and sliding back must be so rigid as practically to form a solid whole, otherwise the negatives will not register.

For really satisfactory results a fourth plate is a necessity. There is no occasion to be dogmatic as to what plate and filter it should be so long as the result is a good orthochromatic rendering of the subject.

The present form of sliding back which slides horizontally is cumbersome. It requires the presence of an assistant to push it along after each exposure, which wastes time, leaves the operator at the mercy of his assistant and is disquieting to the sitter. The back should slide vertically or at an angle, a catch releasing it after each exposure so that it falls of its own weight, into position for the next exposure. This would be under the control of the operator and reduce the total actual exposure to its shortest possible limit.

Having made a sufficient number of sets of negatives (three colour and one orthochromatic) to make up a sheet of, say, nine half-plates or six whole-plates, the first step is to set out the orthochromatic or tone negatives.

Arrange them on a thin sheet of card with equal margins between, mark them round, and cut the space out in the card, making the openings quite $\frac{1}{2}$ inch smaller all round than the negatives. Touch the margins of the openings lightly all round with seccotine and place the negatives in position. Then turn the sheet over on a glass and stick strips of cork round the margins which press on the negatives. These strips can be obtained at a cork cutters and should be $\frac{1}{8}$th inch thick and about $\frac{1}{4}$ inch wide. When the whole is thoroughly dry it is ready for exposure on the first collotype plate, which goes through the usual routine till it is printed on the machine.

Here great care is essential that all is rigid and the lay correct before running off the required number. These should be printed lightly and evenly in a soft grey and a fair number printed over for waste. Then a further run of thirty or so should be made in a decided black, for use in obtaining register in the machine,

and finally two or three sheets pulled on thin celluloid. The plate should then be washed out and kept, as it will most likely be wanted again.

The second set of negatives, that is the yellow printers, are set up next by means of one of the prints in celluloid. It is best to have a special bench made in front of a window for this class of work. Cut an opening in it in which is laid loosely a sheet of plate glass. The window should be continued under the bench, and a reflector placed at such an angle as to reflect evenly up through the glass.

By this means it is easy to examine the whole sheet flat and place the negatives in position without fear of slipping. The celluloid sheet must be placed inked side downwards on the glass bench, the negatives having been touched round with seccotine, can then be registered perfectly on it, after which a similar mask to that first cut and on which similar strips of cork have been previously fixed, should be pressed very gently and evenly on the negatives and left to dry.

When all is dry, a sheet of glass should be placed on top, and then, lifting the glass out of the bench, the whole can be turned over bodily, the bench glass and celluloid sheet lifted off and the remainder put in the exposure frame for the next plate. On the following days the red and blue printing plates can be made, registering from the celluloid print in the same way, so that in four days the print will be complete. In whatever way the prints may lack balance or contrast, the first tone plate can be put on again and a faint printing made from it in whatever tint may be necessary to put all in balance.

The colour inks behave differently from black. The yellow has a tendency to clog, so that slab and rollers require partial cleanings at times to keep the prints even. The yellow should be printed fairly strong as it is the bottom colour. A piece of blue glass similar to the colour filter used will greatly help in judging them. The red has a tendency to run flat and is the most difficult colour to print. The blue should be put on lightly at first, as being the top colour it would soon predominate. This method of printing glass negatives together by means of cork strips is no new idea, neither is the registering by means of celluloid prints, but the practical combination of the two enables a number of colour negatives to be printed together, and by that means the cost is immensely reduced. High-class portraiture that would commend itself in any studio could be produced by this means at a good profit, and at a price less than platinotypes or carbons.

Cutting Barley.

Amalgamated Press Ltd.
(Process Dept).

Photograph by
J. E. Tyler.

W. F. Sedgwick, Ltd.

A Photographic Study after Romney.

Decorative Photography for Printers.

By ERNEST W. JACKSON.

Illustrations accompanying these notes are intended to show some of the possibilities of the purely decorative photographic print in its application to the making of book ornaments for printers. The examples are given as suggestions only; each worker, if he aims at originality, of course, carries out ideas in his own way. The decorated photograph and the combination of photograph with ornamental design in pen-and-ink or wash work are obviously nothing new; every issue of this Annual has contained many charming examples of such combinations, but the decorative photograph, which is decorative *in itself*, has, we think, hardly received the attention which it deserves.

It is not necessary to photograph our subjects in any special way for the purpose of making photographic designs. If we have by us any floral subjects it will be found that almost any photograph of plant form may be turned to good account when one understands the procedure. It is, of course, a great help when one has a knowledge of the principles of design. These may easily be learnt from any text-book on the subject. Three principles especially will be found to come into play in almost all ornamental designs,

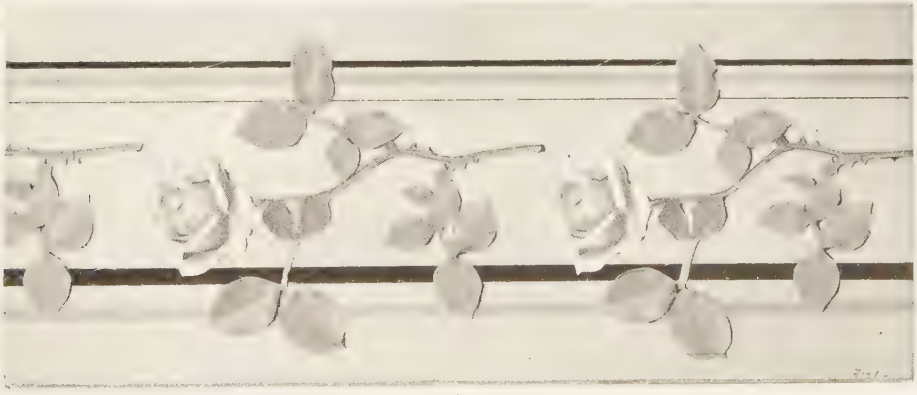


Fig. 1.

viz., repetition, symmetry and radiation, the chief of which is repetition, and as photography offers us an easy means of turning out any number of copies of

the same subject all exactly alike, the making of decorative designs with photographic prints resolves itself practically into a matter of one's ability to combine these prints together with accuracy and neatness.

A border as shown in Fig. 1 presents no difficulties. The flowers are first cut out from their background (which in this case was not a very evenly-lighted one) and then pasted on to a sheet of suitable paper or board at regular distances to make a kind of running pattern. Naturally one chooses a subject that "repeats" well. The horizontal white and black lines which help to give continuity to the design are, of course, drawn on the background before the prints are pasted down. These lines will be found to serve also as a useful guide as to the placing of the prints.

Fig. 2.

Design for Tile Decoration.

In making designs in the manner of these examples success depends largely on having all the component parts of the composition exactly alike in tone, and to this end we recommend that the prints be made on gaslight paper. By adopting this medium, if the exposures are accurately timed, and the prints developed right out, any number of "repeats" may be made all absolutely similar.

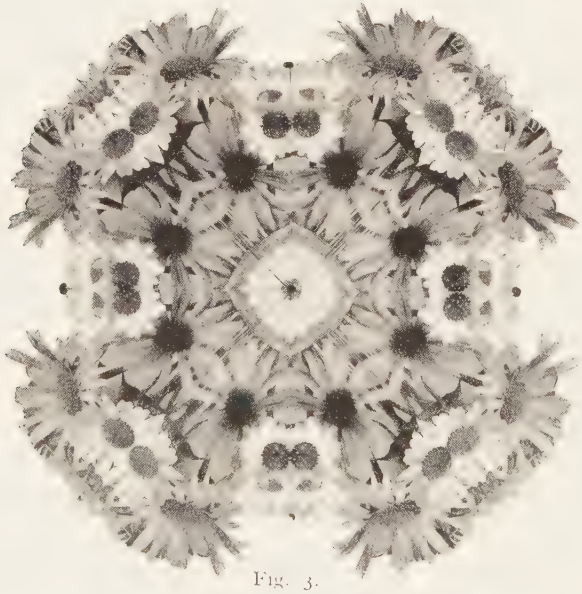


Fig. 3.

A Rosette.

It will be noticed that the designs illustrated in Figs. 2, 3 and 4 are a combination of reversed prints. To obtain these the flowers (or whatever our subjects may be) should be photographed on films. Films can, of course, be printed from either side and so give identical subjects but reversed in position. Or the carbon process of printing may be resorted to, when the prints would be made by both single and

double transfer. Fig. 2 is designed to give an imitation of "tile" decoration, and if, say, three of these "tiles" were placed side by side the combination would, I think, make a pleasing and novel tailpiece. The very narrow space left between each print is intended to represent the cement which is used to hold the "tiles" together.

To produce Fig. 3 eight segments are required, four in reverse to the other four. Perhaps the simplest way to obtain these is to place a set-square of 45 degrees over the part of the print to be used, marking with pencil, then cutting to shape. (By cutting up a few prints in various ways one soon finds out which part best answers one's requirements.) If a transparent celluloid set-square is

Fig. 4.

A Floral Border for a Landscape Photograph.

used, identical portions of a subject may be gauged without the least difficulty. Two lines at right angles are next ruled on a sheet of cardboard to serve as a guide in mounting the prints, and if the eight segments have been accurately sized and trimmed they will, when pasted within these lines, be found to fill up the whole space exactly. It may be mentioned here that the centre part of this design (Fig. 3) is formed by a small portion of the neck of the vase which held the flowers.

The border for a landscape picture, Fig. 4, is made from the same subject as the last one, but in this case eight similar strips of equal width are first cut out. The corners are cut exactly at right angles, mounting being merely a matter of

deftness in placing the prints together so as to make the joinings as little noticeable as possible. It is advisable to make designs such as we have been describing several times larger than they are intended to appear in actual use; the process of reduction refines the work and serves to eliminate any unevenness that may have resulted by irregular joining of the prints.

In conclusion, a few words may be said as to which class of subject is most useful for making decorative photographic designs. Flowers and plant forms generally are, of course, highly decorative and always satisfactory. But there is practically an unlimited supply of material with which one can form "motifs." Any objects with radiating lines are especially to be chosen for decorative work. We have only to think, for instance, of seaweeds, shells, wings, grasses, and such things as fir-cones, acorns and other seed-vessels to realize that numberless interesting designs may be originated by combining photographs of such objects together in the manner we have attempted to describe.

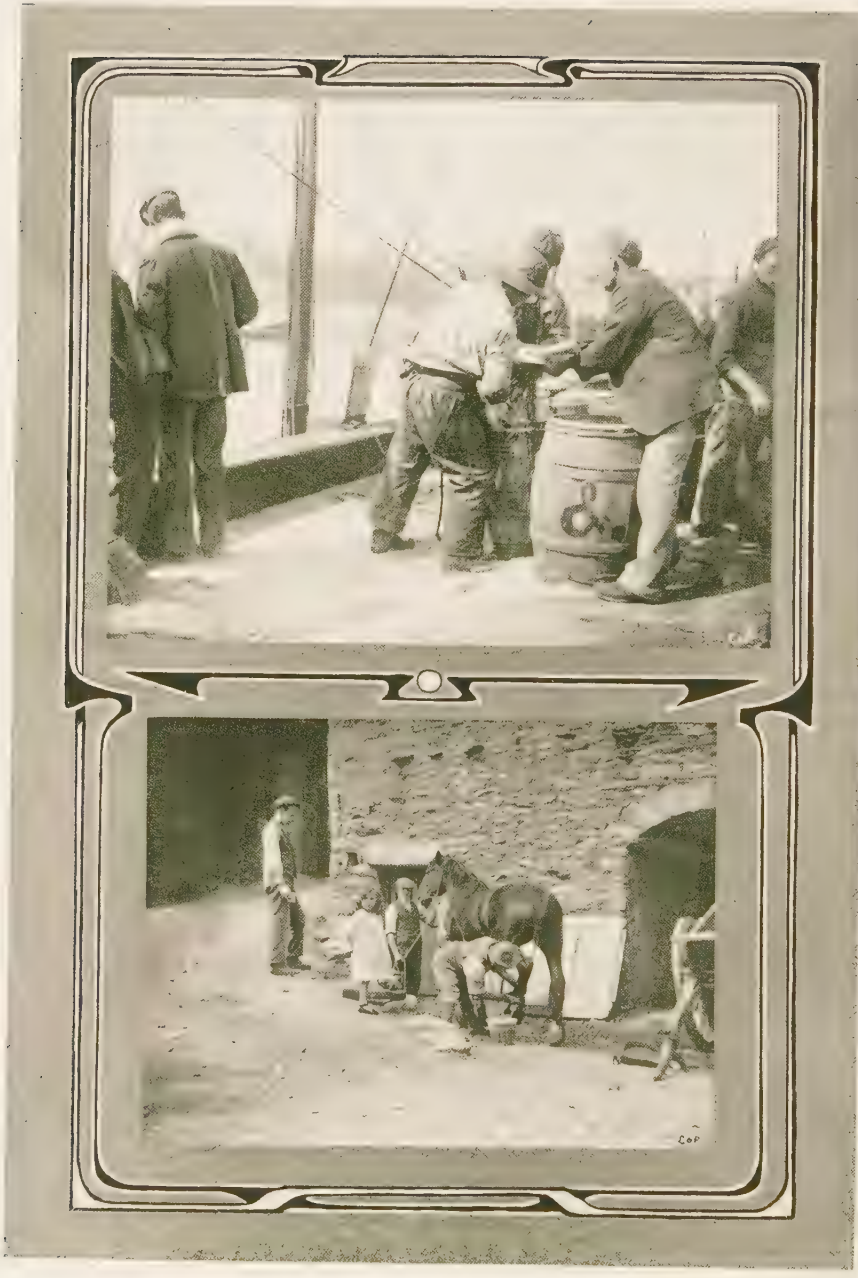
The blocks for the Illustrations to this article have been engraved by A. E. Dent, Ltd.

A Photographic Tailpiece.

The Arc Engraving Co., Ltd.

From a Drawing by J. T. Cattle.

The Huntsman.



London & Provincial Reproduction Co., Ltd.

Holiday Snapshots.

Swan Electric Engraving Co., Ltd.

Photo by R. R. Tyrer

"The Gentleness of Heaven is on the Sea."—*Wordsworth.*

E. Hamel & Co.

Photograph by Freckleton & Co.

A Pretty Study.

Arc Engraving Company, Ltd.

By Constable.

Inks by Shackell, Edwards & Co. Ltd.

The Valley Farm.

Telephotography.

By E. BIERMANN.

King's Norton, Worcestershire.

DURING the past two summers I have devoted most of the little spare time that I have had to the study of a most fascinating branch of the Black Art, namely, telephotography, and with the hope that my fellow process men may find some interest therein, I propose to give an outline of my methods and to discuss a few of the uses to which telephotography may be put both for pleasure and profit.

Telephotography is the distinguishing name given to the method of photographing objects from a greater or less distance with the aid of supplementary lenses known as tele-negative lenses. These are used either singly or in combinations at the back of a special focussing mount, to the front of which is attached an ordinary photographic objective which is called the positive lens. The optical combination thus formed has a variable focus whose equivalent is always greater than the camera extension in use, and is variable not only within the limits of the camera extension, but by varying the focus of the negative lens. The combination can be focussed at any extension of the camera by varying the separation between the positive and negative lenses by means of the rack and pinion provided on the special mount, so that instead of a telephoto combination being only one lens it is a whole battery of lenses, as it is possible to obtain photographs of the same object in many sizes from the same standpoint by the simple operation of reducing or increasing the camera extension and refocussing with the rack and pinion.

Besides the combinations formed by adding a negative lens to a positive lens there are several telephoto lenses upon the market which are complete in themselves, such as the Adon and the Pancratic each of which has a considerable range of magnifications.

Telephotograph of King's Norton Church Tower from same standpoint as above general view.

The blocks illustrating this article are by The Arthur Cox Illustrating Co.

Near View.

Telephotograph at 11 Magnifications.

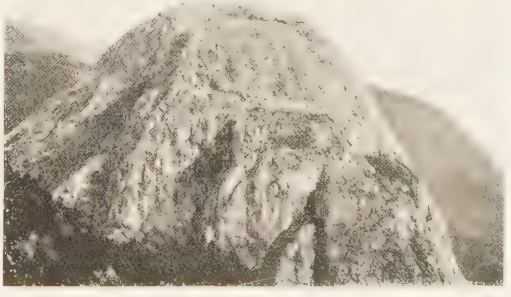
Two views of the same house to illustrate the value of Telephotography as an aid to the picturesque.

Many uses to which such a lens can be put will doubtless strike the thinking photographer at once according to the particular work upon which he is usually engaged. Suppose, for instance, that one is engaged to obtain a series of photographs of a Cathedral, and besides the ordinary pictures of the interior and the elevations a number of details of the carvings and sculptures are required. These being frequently in quite inaccessible places for ordinary photography, here is a chance for the telephoto lens, as from a reasonable distance away it will be quite possible to get a good sized picture of any detail on practically any portion of the building.

The Naerodal Valley
from Stalheim.

Again, let us suppose that one has a commission to photograph a number of views on an estate which is for sale and the owner of the estate or the auctioneer wishes to show buildings or views to their best advantage, a photographer armed with a telephoto outfit has powers that are absolutely denied to one less well equipped. For instance, a certain site may be offered for sale for building purposes with quite good views to be seen a little distance away, but how inadequate is ordinary photography to give any idea of a simple view only five or six hundred yards away, yet the telephoto lens will render that view almost as well as an artist would paint it. Another example of its use in estate work is illustrated by the accompanying half-tones showing the different aspects of a house at close quarters and at a distance of half a mile.

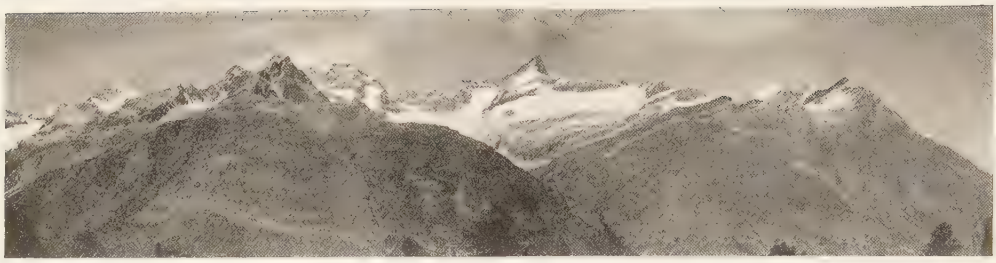
The value of a telephoto lens to a naturalist photographer is well known and needs no comment, but its value to the pictorialist is not quite so obvious; still its powers in this direction are very considerable if one will only think of the many pictorial compositions that are seen from a distance which are entirely lost when seen from the ordinary point of view of the camera, yet groups of cattle and trees and buildings can be telephotographed from a reasonable distance and much better composition and perspective obtained than at close quarters.



The Summit of the Jordalsnut
from the same standpoint as above.

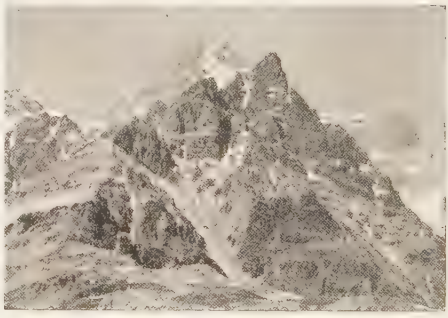
For photographing inaccessible mountain peaks telephotography is *par excellence*, the accompanying illustrations showing what can be done with quite portable apparatus; the original negatives are only $\frac{1}{4}$-plate, but they enlarge

1 2 3 4

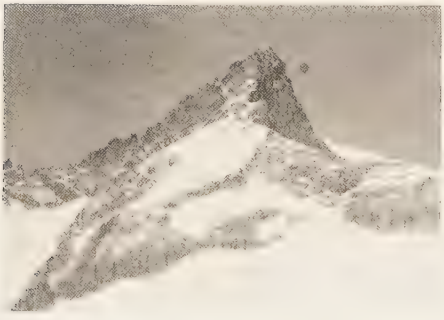


Panorama from the Riffelalp, Zermatt.

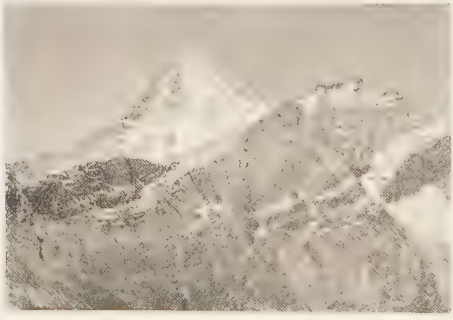
No. 1. The Dente Blanche.



No 2. The Gabelhorn.



No. 3. The Rothorn.



No. 4. The Weisshorn.

Telephotographs of the principal peaks in the above panorama taken from the same standpoint at 6½ magnifications.

perfectly up to three diameters and are reproduced in exact proportion to the originals.

In the commercial studio there are uses for the tele lens where objects are required to be reproduced to a large scale, as full size negatives can be obtained without excessive extension on the camera and with the camera at a much greater distance from the object, with the consequent improvement in perspective.

Then there are the all-important naval and military aspects of telephotography. Forts and harbours can be quite well photographed from a distance out at sea, also much valuable work can be done from a balloon or airship, and Captain Owen Wheeler has recently invented a special camera for such work.

Now as to method, apparatus, etc., any ordinary studio or stand camera can be used, providing that it is rigid, as vibration is its greatest enemy. It will be necessary for the beginner to master one or two simple mathematical formulæ before he can do any practical work, the most important of which is to be able to calculate the magnification; to do so we must first know the focus of our negative lens, then the camera extension is measured from the back of the lens to the ground glass and the distance divided by the focus of the negative lens and one added to the result. That is to say, if the extension is 9 inches and the focus of the tele-negative is 3 inches, we get a magnification of four times. Having obtained this we multiply the focal value of the diaphragm in the positive lens by the magnification and this will give us our working aperture. Thus, if our diaphragm is *f*/8 and our magnification is four the working aperture of the combination is *f*/32.

Then as to exposure, theoretically the ordinary exposure for the positive lens alone should be multiplied by the square of the magnification, but in practice it is found that from two-thirds to half of this is sufficient, but any one having one of my exposure indicators will get correct results by using lens factor No. 3.

To obtain brilliant negatives it is necessary to avoid all internal reflection, and to this end a long hood must be used in front of the positive lens, also for outdoor work it is advisable to use an Ortho plate and yellow filter; this need not be a very deep one, a three-times being quite sufficient for most purposes, but for very long distances where the blue haze is likely to cause flatness a six times or even denser filter must be used.

Telephotography is of such importance that many eminent workers are devoting much time and attention to it, and I trust that I have said enough to prove that it has distinct business possibilities and to induce some of the trade to be among the first in the field with a comparatively new thing.

EXPECTANT PEKINESE.

Half-tone Block by
ENTWISTLE, THORPE & Co

Photograph by T. FALL.
Negative on a
GRAPHIC PROCESS PLATE.

The Conjugate Scale Apparatus.*

By ARTHUR FRUWIRTH (Brooklyn, N.Y.).

A Study in Canine Expression.

Photograph by Thos. Fall.

Press Etching Co.

SETTING the focus by automatic means in place of ocular focussing on the ground glass was made by me the subject of a study in last year's Annual. While on that occasion I treated automatic focussing rather in a theoretical way, explaining how from a key chart the working scales may be prepared, I will now illustrate the evolution from a mere "system" to a commercially manufactured article, an accessory to the camera, attached to it by a few screws, adjusted by a gauge and performing the work which since the days of Daguerre was delegated to the ground glass. I refer the reader to my previous article and consider the following lines as a continuation of the earlier study.

The proposition to lay a chart in the operator's hands, together with a dozen prescriptions, and tell him to make his own scale is, no matter how unimpeachable the data may be, an impossibility. What he wants is the real article.

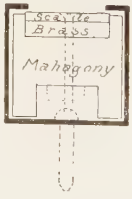


Fig. 1.

In order to prepare focussing scales it is, of course, necessary to have the lens and determine its equivalent focus. It is equally imperative to present the operator with means for positioning his scales.

The conjugate scales are enclosed in brass tubings $\frac{5}{8}$ in. square (see cross section, Fig. 1). They are prepared in one piece, enamelled and mounted on a brass band, which in turn is screwed to a strip of mahogany. A short inch rule *a* (Fig. 2) is connected with the forward end of the anterior conjugate scale in such a manner that by manipulating the double lock screw *b* the inch rule may be locked in position while the scale can be moved, the amount of movement

Fig. 2.

being registered by the edge of indicator *c*. A second tube contains the posterior conjugate scale.

* Patent applied for.

In order to attach both scales to a camera and stand the tubing is screwed on and then the scales are inserted. The correct position of the scales is given

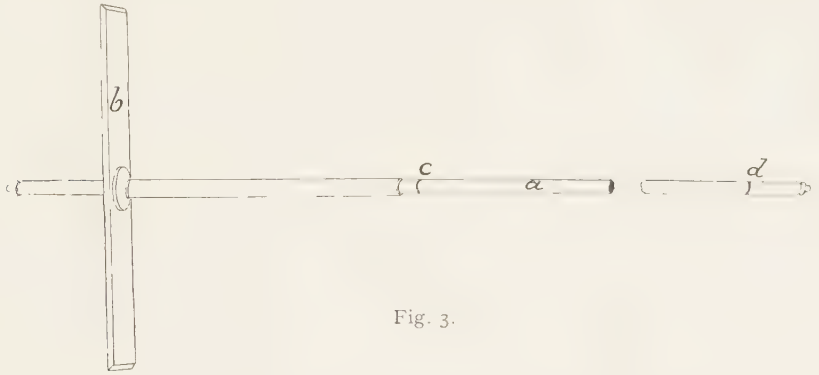


Fig. 3.

by what I call the scale gauge, a steel tube *a* (Fig. 3), with a movable platform *b*, and provided with two engraved circles *c* and *d*, near both ends. The platform is held against the lens flange (see Fig. 4) and by pushing in or pulling out the tube as far as the circles indicate, the same size position of the camera is correctly established. All that remains to be done is to slide both scales with index 100 under the indicator edges, to set the inch rule on 0 and lock securely.

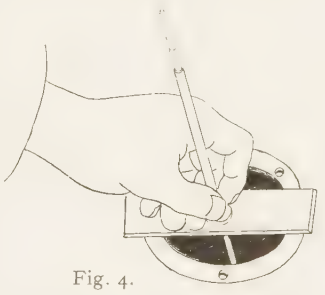


Fig. 4.

The scale gauge, besides furnishing the correct scale position, reveals also the two equivalent points of the lens. Let *a* (Fig. 5) be the measured distance from ground glass and *b* from copyboard at natural size, then both distances added represent four times the equivalent focal length, plus the separation between the two equivalent points. The equivalent focus is already known as the distance of two successive magnifications on the scales, for instance, same size and half size. Marking double this length from either end of the gauge will therefore locate the equivalent points.

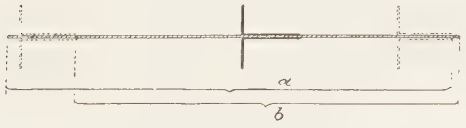


Fig. 5.

What is the function of the inch-rule, the reader will ask? It is quite important. I have stated that the inch-rule can be independently locked while the scale remains movable by the length of the slot. Suppose we copy from a book which extends $1\frac{1}{8}$ in. over the surface of the board. Shifting the scale backward by this amount (indicated in Fig. 2) will adjust the scale and the focus can be set as if no shifting had taken place. This is one instance of many.

Where cones are frequently used or the lens at times is carried inside the camera a readjustment by the gauge becomes necessary. But only once. Scratch-marks opposite indici 100 on the tubes will locate the identical scale positions whenever wanted.

But the scale apparatus is capable of still finer adjustment. Suppose the case of a rectilinear lens of 22 in. focus afflicted with curvature of field. Losing central definition for the sake of flatness of field (spreading the focus) may become

desirable with extra large negatives. Focussing same size 4 in. away from optical centre (embracing an angle of 10°) may reveal a displacement of focus forward and at the same time contract the image. To re-establish the size a uniform shifting of both scales forward by $\frac{1}{16}$th in. may be necessary. This spreading of the focus is notated on the inch-rule and may be resorted to at any time.

The influence of a glass plate over a copy or a half-tone screen on the focus may likewise be considered. In each case the focus is displaced backward.

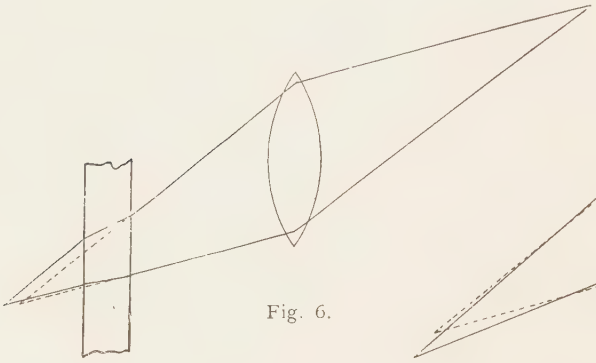


Fig. 6.

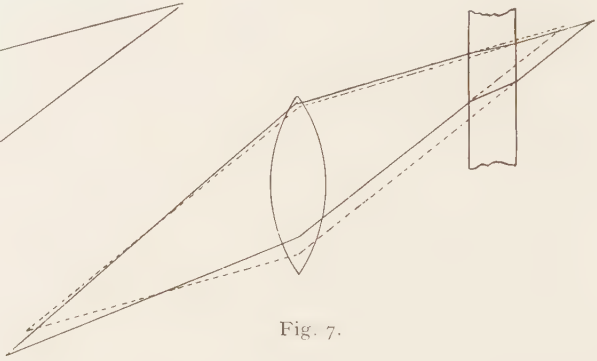


Fig. 7.

Figs. 6 and 7 will illustrate this. At the same time the size of the image is altered —contracted, if the plate is behind (Fig. 6) and expanded if in front (Fig. 7). With an average refracting index of 1·52 the displacement amounts to $\frac{1}{3}$rd the thickness of the plate, or in other words, in the case of a coverglass the light seems to proceed from a point $\frac{1}{3}$rd the thickness nearer the lens. Likewise the displac ment created by the screen plate may be reckoned with. Though of what hair-splitting importance this matter is shows the fact that those operators who carry the screen in the holder never readjust the focus. Only "register jobs" require special attention.

Let me say a parting word in favour of one improvement in connection with scaling, which has become dearest to me, because as unique as it is simple. I have always felt a shortcoming in scale focussing, arising from small or medium sized negatives, which for lack of a partner had to be taken separately, until the problem of photographing two copies of different ratios, of which one may be a reduction, the other an enlargement, found a most simple solution. Since then small negatives by separate exposures for every little bit of copy has become exceedingly rare. The modest expedient doing this and costing next to nothing is a dark slide of the shape drawn in Fig. 8. It is reversed after one exposure and the focus reset. I hardly need to say that the two copies are arranged on the copy board on opposite sides of the exact middle line.

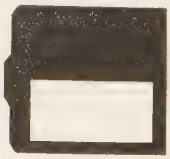


Fig. 8.

The speed, simplicity and ease of scaling have not been without influence on other operations, notably mounting copies, bunching those of very different light and colour values or the resources in the after treatment of the negatives. But more than this, the gradual introduction of focussing scales in the United States will preface certain changes in camera construction and the not very distant future may see a new type of process camera.

Half-Tone Engraving Co., Ltd.

Inks by Ch. Lorilleux & Co

"By the Rivers of Babylon."

Reproduced from the "Copping" Bible by permission of the Publishers, The Religious Tract Society

Wallage & Gilbett, Ltd.

Drawn by Hanslip Fletcher

York Minster.

E. Hamel & Co.

Photograph by Freckleton & Co.

Amongst the Flowers.

Wald. Zachrisson.

In Dalecarlia, Sweden.

British Photo Engraving Co.

Photograph by R. R. Tyrer.

A Lazy Brook.

New York State Grapes

Photographed from Nature

Three-Color Blo
The Zeese-Wilkins
New York

Museums and Institutes for the Modern Graphic Arts.

By LEO HAGEDOORN.

A LITTLE SHRIMP.

LONDON & PROVINCIAL REPRODUCTION CO., LTD. Photograph by K. F. BISHOP.

ALLOW me to draw the attention of your readers, professional and amateur, in the various branches of the graphic arts, to a gap existing almost everywhere in our industry.

I refer to the general want of collections, skilfully selected by competent hands, and consisting of the most important works daily produced on our presses ; of samples of tools and materials used at the present time ; of models of machines, which have given real satisfaction ; of models or designs of architectural construction for studios and workshops proved to be of practical value ; of electric installations used in the graphic industries ; of means for promoting the health and safety of the employés in our trade ; in short, museums of everything that can be of interest to the worker in the field of the graphic arts, and which will enable him to elevate his craft.

In almost every country large contributions are made by private persons, as well as by the Governments concerned, towards the maintenance and extension of collections of paintings and sculpture. Enormous financial sacrifices are also made for the discovery and collection of remains of the earliest periods ; large sums are also required for Libraries, Universities and Technical Schools of every description. The request for a reasonable amount for the benefit of the graphic art and industry can therefore not be considered an exaggerated claim ; especially as the grants made would undoubtedly tend to promote the development and advance of the profession.

When we make an estimate of the enormous number of all those called upon to practise and bring up to perfection the different branches of the graphic arts, and when we also consider that every intellectual person takes an interest—it may be an indirect one—in the improvement of the productions, especially as regards the quality, we may safely admit that money laid out for improving and advancing these arts and crafts will not be spent for the benefit of a single class, but will be on behalf of society at large.

We certainly appreciate the praiseworthy endeavours made throughout the whole civilised world for the development of graphic arts and industries. Let us only mention, for instance, the most useful achievements of such institutions

as the " Deutscher Buchgewerbe Verein " at Leipzic, of the sub-divisions of the " Musée pour les Arts et Métiers " at Paris, and those of the South Kensington Museum in London, among many others. We may also add the very costly collections—open to the public—containing incunabula and earliest printed books, rare engravings and hand-illustrated prayer-books, etc. When we consider all this, we must gratefully acknowledge that a great deal has been done for those who concentrate their study particularly upon the historical and æsthetical value of the specimens.

Far less has been done in favour of the practical worker who has to make his enterprise answer the claims of the present day for quickness, completeness and cheapness. It would be a task as pleasant as useful to carry his productions to the highest point of perfection attainable—to enable him to increase his knowledge and to execute even a trifling order in an irreproachable manner.

It will be acknowledged, even by the non-professional, that in general the existing collections do not sufficiently respond to their mission, to enlighten the practical worker, although they have been, to a great extent arranged for that purpose.

However much the professional of the present day may enjoy the exhibition of our earliest graphic experiments and devotedly appreciate the extraordinarily clever work produced with such very slight resources and materials, nevertheless, considered from the point of view of useful instruction, the value of these costly specimens is but very limited for him.

His liking for colours may be agreeably gratified by the magnificently warm tones of old parchment, his sense for proportions and symmetry may be highly pleased with the continuous series of faint black characters on a beautiful ground of dull gold ; but, returning to his printing-office, will find his customers want a clear and pronounced letter of a bold advertising style, to be printed on unpleasantly glossy paper for the sake of cheap blocks, which cannot be annihilated.

It is evident that a far greater service would be rendered to the practical worker by a collection of specimens, showing him how the best of his profession overcame the difficulties of modern printing technique.

And it is much about the same in all sub-divisions. For instance, the type-founder of the present day will certainly be more interested in the finding of a suitable casting-metal, still harder than the present, and at the same time more elastic, than in, for example, an essay upon the wooden and leaden letters of the 15th century.

Modern museums are really wanted, for permanently exhibiting the most important appliances, based upon, and in accordance with, the demands of our time. In order to avoid a one-sided character in these museums, they might exchange between them some parts of their collections. This would enable the workers to get acquainted with the best—perhaps with the worst also, for a change—produced beyond their own countries.

These collections would have to be constantly kept up-to-date. Everyone must be able to find there what he requires, not only the most artistic etching and most complicated intaglio processes, but also the every-day rotary newspaper printing, which is in its way certainly not less important than the other.

A carefully selected library of the text-books must enable the serious searcher to benefit from the results obtained by his great predecessors. This division must be as extensive as possible. He who wants to increase his knowledge of the laws and principles of light-vibration and spectroscopy ought to find there

as ample information as the man whose interest it is to ascertain the composition of a special sort of paper.

Institutes combined with these museums are also greatly needed. A small but effective staff of professional men, well posted up in practice and theory, could make experiments there and publish the results of them, the advantages of same would benefit the public at large and not remain the property of exploitants who keep them only for their own profit.

Men of very high standing in matters of art would have to be the leaders and advisers upon the work, and also in the choice of specimens for exhibiting.

Leaving aside the question who would be the right men to promote the establishment and to carry out the installation of such an institute, we fully admit that a very great deal has to be done before such an ideal can be realized.

However, should a professional school of great reputation, in combination with the very-powerfully growing trade-unions, be able to secure the aid of a liberal capitalist, or to obtain a subsidy from the Government, the difficulties of realizing the idea outlined here will no longer appear so unsurmountable as they did at first, and the erection of one establishment in this manner will certainly make a way for others.

The interests of thousands of industrious workers in the most important trade of our civilization would be benefited by it.

"It Won't Go Right."

Pawson & Brailsford.

Photograph by
K. F. Bishop.

A Two-Tone Process.

By MAURICE LÉTÉVÉ.

A Country Maid.

Ai Engraving Co. Photograph by E. E. Hindley.

HAVE been trying some experiments with two tone, and I am rather pleased with the result. A description will perhaps be interesting to your readers.

I take a negative and a positive with a screen from the same photograph, print them on zinc or copper, and after etching pull first the lighter tone, with the negative plate, and afterwards print the positive plate. The resulting effect is very pure in colour, as the points of the positive fall alongside the points of the negative. I find that this gives a better result than making blocks with two different angles of the screen. Some very nice effects, suitable for magazine covers, may be obtained quickly with this process by printing a design in two complementary colours.

I have found a method of reversing to avoid the necessity of making a positive so as to have a negative on the plate. I cover the zinc or copper plate with sensitized bitumen; when it is dry I cover this with a coating of enamel and print this under the negative. Afterwards I develop and colour it very strongly with blue aniline—that does not affect the bitumen at all—and it gives me the effect of a positive film on my bitumen. I expose it again and then develop with turpentine, having first washed off the enamel with hot water. Thus I obtain a very fine negative on my plate, with clean sharp dots, better than any other way of reversing.

Expectation.

Ai Engraving Co. Photograph by T. Fall.

A. Cox Illustrating Co., Ltd.

Inks by B. Winstone & Sons, Ltd.

"Daffodils."

Technical Education in the Graphic Arts.

By F. J. TREZISE.

TRADE Schools and technical educational institutions founded and maintained by municipalities, corporations and philanthropists have long been among the various forces tending to the betterment of the craftsman by giving him a broader knowledge of the work in which he is engaged. Rarely, if ever, though, has one heard of an educational movement of large scope launched and maintained by a trade union. It has been commonly supposed that the particular business of the labour union was to enforce its demands for a better condition by means of numbers and financial strength, and not by reason of the superior intelligence of its members.

This is a brief description of how one labour union realized the need of a greater efficiency among its members, and how it endeavours to secure that efficiency.

At the 1908 Convention of the International Typographical Union, someone with a prophetic turn of mind suggested that if the Union expected to preserve its prestige in the future, it must educate its members to a higher standard of efficiency, and introduced a resolution calling for an appropriation for supplemental education.

His proposition was more or less unique in the light of popular ideas of trade unionism.

He contended that the future of the Union lay, not in numerical strength nor in the fulness of its treasury, but in the superiority of its men.

He also contended that the learning of the trade in the average shop was not conducive to this superiority—that it must be gained by some manner of supplementary education.

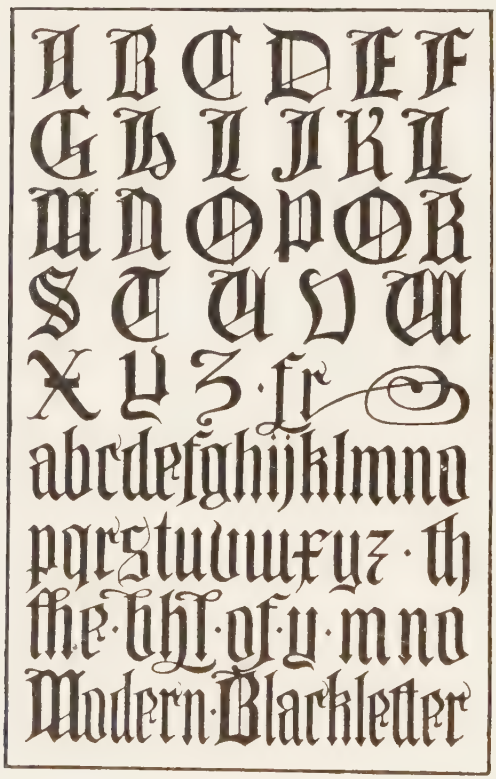
Thus was created the demand which resulted in the I. T. U. Course of Instruction in Printing.

The resolution was passed, and the committee appointed immediately took steps to ascertain in what manner this desired supplemental education could be furnished. After considering and rejecting several propositions it was finally decided to establish a correspondence course, as in that way only could all the Union's members be reached—the ones in the remote Klondike and Alaskan towns, as well as those in the large centres. In putting the proposition through it was naturally necessary to overcome much prejudice, as many raw fakes masquerade as correspondence schools, and the question of "learning a trade by correspondence," as some expressed it, was not looked upon with favour.

The question in this case, however, was not one of learning a trade, but learning the principles upon which the trade rests—learning those things which the routine of the average apprenticeship did not teach.

In this exploitation of principles—in this application of modern educational methods in typography—lies the instructional and student-getting success of what is popularly known as the I. T. U. Course.

The Course, when completed, consisted of thirty-seven lessons. The first nine lessons are devoted to the study of hand-lettering. There are excellent reasons for this: the printer can get an understanding of the derivation and design of the various letter forms, together with a knowledge of their proper use, more readily in this manner than by work in the composing room. Then, too, the development of processes of reproduction, constantly making special designs more desirable and more available, opens a new field for the printer—a field in which he can and does excel the art school graduate.



GOTHIC ALPHABETS.

Designed by
WM. DE ROSE.

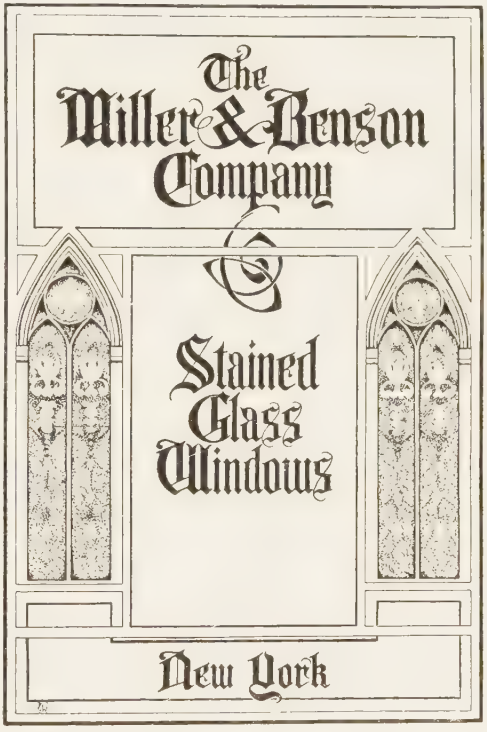
Lessons 10 to 14, inclusive, treat of the principles of design. These lessons are the key-note of the Course, as they are explanatory of the foundation upon which typography is built. In them the questions of balance, proportion, shape harmony, tone harmony, etc.—in too many instances mere cant phrases in the printing office—are taken up and taught in a thoroughly practical manner. In this teaching the printer learns the "why" of these principles of design—principles which he has, perhaps, been unconsciously expounding, without even recognizing them as principles. This gives him a sound working basis—his daily work is no longer with him a matter of conjecture. He knows what is right, and, better still, he knows *why* it is right. He does not depend altogether upon that elusive something known as "good taste," or following the style of some passing popular compositor or doctor of printing.

The lessons on colour—fifteen to nineteen—are treated in much the same manner. Colour is taught from a scientific standpoint, rather than one of personal taste, and the colour instruction is all designed to be of actual working value.

With lesson No. 20 begins the actual work in typography—the putting into practice of the principles of lettering, design and colour acquired in the previous lessons. In this work the value of studying principles is apparent. The student does not follow the work of others, copying it parrot-like, but creates designs, building them up understandingly upon the art principles which prevail in all design, whether typography, wall paper, architecture or any other form.

As stated above, the lessons on design are the key-note of the Course. These

lessons consist of a study of the fundamental principles upon which printing is based, and these principles are stated as proportion, simplicity, tone harmony and shape harmony. Perhaps, in order to give an idea of the methods of the instruction, a brief consideration of proportion as it is applied to typography may not be amiss. Proportion is defined as being "the pleasing inequality in the parts of an object." In this definition, then, the word proportion covers such printing-office terms as "whiting out," "distribution of white space," "balance," etc., gathering them all under one head—and definitely defining that head. The "whiting out" of a job, for instance, merely means the distribution of the white space. We cannot distribute the white space equally, and the pleasing unequal distribution is proportion. Likewise the breaking up, by lines or groups, of a title page into pleasingly unequal divisions is proportion. Then comes the question, "what is pleasing inequality?" The student learns that as a first principle in proportion the breaking up of a page into spaces which are related to each other as three is to five—in other words, that the small space shall be to the large space as the latter is to the whole page—is the most pleasing (an admitted principle in design). He designs his page on this basis. If he has but one line or group, he places it at a point in the upper part of the page which divides the page into these proportions, thus securing the "centre of attraction." If he has two or more groups he places them so that the centre of balance between them comes at this point. If he builds up a panel design, he sees to it that the various panels are related one to the other in the above proportion of three to five. In making the margins for books, etc., the same principle of proportion is applied.



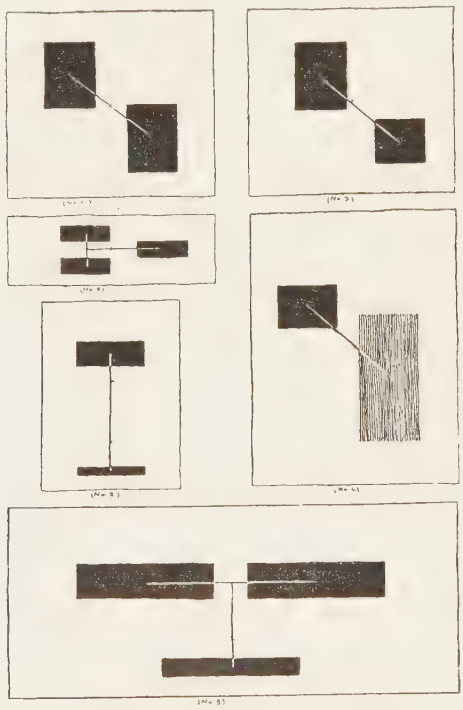
Application of the Gothic Letter.

Designed by
Z. E. Weatherley.

The success attained by the I. T. U. Course in Printing opens up a new field of endeavour for trade unions. There is, perhaps, no calling the followers of which would not be benefited by a supplementary course of instruction—even though it consisted of nothing more than a few carefully selected books to be used as supplementary reading. With all due consideration for the average craftsman's contempt for "learning a trade out of books," it must be admitted that much may be learned in this manner—and usually much that is not available to the average apprentice in the ordinary shop routine.

A thorough working knowledge of what might be termed the practical side of a trade—and under modern conditions even this knowledge is well-nigh

impossible—must be supplemented, if the craftsman is to attain to his highest efficiency, by a thorough understanding of what might be termed the theoretical side. In printing, for example, the workman who studies the various alphabets—their derivation, history and application during the various periods and in various localities—cannot but have a clearer conception of what may be done with those alphabets than does the workman who merely puts them together as so many characters to make words. The workman who studies the science and theory of colour harmony cannot but take infinitely greater pleasure in his work—and produce infinitely better results—than does the workman whose knowledge of colour harmony consists in the "practical" information which he gathers around the ordinary printing plant.



A Lesson in Balancing Measures.

By Jos. J. Schichler.

The success of the Course has been marked. In two years about 1,500 students have been enrolled, from all parts of the world. The course is sold at a trifle above actual cost. The International Typographical Union gives as a premium a rebate of five dollars to each student who completes the studies. Some of the local unions supplement this rebate by an additional five dollars to local members, and in some cases employers give to students in their employ a still further rebate of five dollars when the work has been completed.

Although the I. T. U. Course is conducted under the auspices of the International Typographical Union, students are not confined to the ranks of that organization. Anyone working as a printer—either journeyman or apprentice—may take the course, and the rebate offered by the Union as a premium for the completion of the Course goes alike to members and non-members.

Other trade unions are now taking up this work. The American Pressmen's Organization and the Photo-Engravers' Union have plans well developed for courses similar to that of the Typographical Union.

Lascelles & Co., Ltd.

Photograph by Catherine Weed-Ward.

Bolton Priory.

Premier Engraving Co., Ltd.

Photographed by F. G. O. Stuart.

Miss Braddon's New Forest Home at Bank.

Ashworth & Meredith. *Photograph by J. A. Southwart*

When all the World is Young.

Ashworth & Meredith.

Photograph by A. Murray.

Where Devon Meandering Flows.

The Arthur Cox Illustrating Co., Ltd.

Photograph by Elwin Neame.

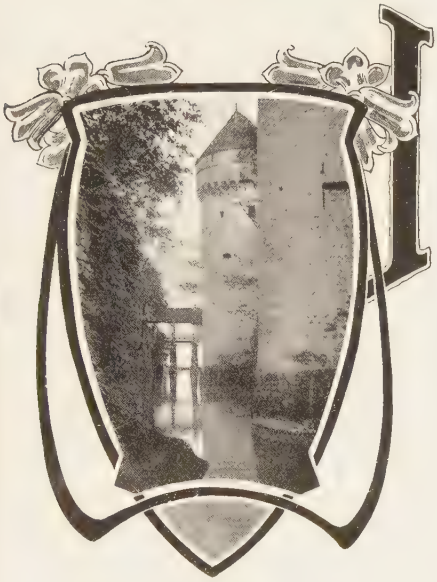
Portrait Study.

Inks by Shackell, Edwards & Co., Ltd.

A Series of Two-colour Effects
produced in two Printings.

Economy in Process Printing.

By ILSTON COX.



THE MOAT, CHILLON CASTLE.

VAUS & CRAMPTON. Photograph by DR. ENGLAND.

IN view of the interest occasioned by my former articles on printing economies, I venture to draw attention to another method by which the effect of eight workings may be obtained in two operations.

At first sight it might appear an impossibility to economize labour to this extent, on an ordinary printing press, but the suggestion can be worked without difficulty by almost any printer having an up-to-date platen machine.

It will be seen from the inset on the opposite page, issued by Messrs. Shackell, Edwards & Co., Ltd., that the idea has been carried out successfully.

Briefly explained, the method adopted is to divide the ink duct and rollers so that two colours may be printed at the same time, and when feeding to "lay to" two different edges of the paper.

In the supplement referred to the first working was fed to the head of the sheet, with side lay on the left hand, the two pictures on the right being printed with a green tint and the two on the left with a yellow.

In the second working the sheets were fed to the edge which formed the side lay of the first working, the previous head now becoming the side lay. By this arrangement the two subjects which were printed one below the other now appear to the feeder to be side by side, and by the same division of ink and rolling it is made possible to cross the subjects of the first working by two other colours, the upper shade being a purple and the lower a sepia. It will thus be seen that the four inks employed give four distinct two-colour combinations.

To obtain good register it is necessary the paper be cut so that the two feeding edges be perfectly square to each other, and when making up the forme it is desirable that the blocks should be placed as far apart as the dimensions of the paper will allow.

The object of this method of printing is quite self-evident, as the printer of a catalogue, for instance, who has to show four differently coloured subjects on one page can, without any trouble, deal with his job in the way indicated.

As I have been asked by various printers if special two-colour blocks are necessary to the process, I would add that I have seen several jobs successfully printed by double impressions from ordinary half-tone blocks.

The Grain as an Expedient in Process Work.

By ALFREDO MANGIAGALLI, Rome.

(Translated by R. Born).

A Crossing Sweeper.
Who claims to be the Earl of Shaftesbury.

The Photochrom Co. Photograph by W. Hartley.

HERE is an argument upon which very few will think it worth their while to write something. Yet, the grain is necessary to-day in photogravure and in the systems of copper engraving in general, also in zinc etching it is of great usefulness, rendering easy in some ways both black and white and colour work.

We can use it as an expedient in the reproduction of line work, where it admirably serves to create those tints and grounds which we would have to obtain by the line itself, or by more mechanical means (screens), with a sharper, but also less artistic, result. We can use it with real success in the reproduction of colour work with the black as detail colour, as, for instance, for artistic illustrations or illustrated papers which are not excessively commercial and where we have not to strictly adhere to the given colours.

Naturally, in the way the grain is used to-day, it offers in practice difficulties which are not easily overcome by the workmen. The difficulty consists in the selection, which in the case of colour work is an absolutely liberal one, and in the etching of the grain.

We desire to get from a half-tone a four-colour print ; let us therefore state a few necessary hints.

We etch the half-tone plate, which will have to serve as black original, select same in the places where the colour will have to appear and make it vigorous in the details. Now, we take three zinc plates of the required measurements and remove the grease carefully. From the half-tone plate we take a proof with abundant ink, using ordinary printing ink for ordinary paper and a greasy one for transfer paper. We transfer the proof immediately upon one of the zinc plates, which, after this operation, ought to show a neat impression of the half-tone block. This operation we repeat for the two remaining plates. Here we have to remark that when putting these plates into the acid bath the ink impression which ought to serve as guide during the following etchings will disappear under the action of the mordant. It will, therefore, be necessary to retain in some way or other this impression which is indispensable for us. Instead of fixing it by means of resin I use the following primitive, but for myself very practical, system. With a sharp steel etching point I make a mark round that which I require as guide in the selection and then let the ink impression disappear during the first etch. I wish this impression to disappear, because should it remain it would create a fac-simile of the black which we shall have to avoid. The line

made with the etching point will serve us very well as guide for the covering, and after the etching it will be useful in retouching by means of the burnisher. The white line which will show in the printing will not injure the final result of the work, because, if this outline is made well, it will get covered by the detail of the black.

Before proceeding further with the work we shall have to cover or protect those colours which will have to come out entirely or the totality of which will have to contribute to the formation of a certain colour. For doing this it has, of course, been necessary to previously establish in our mind or on a sketch the colouration which we intend to give the subject.

This done, we can place the plates one after the other into the bitumen dusting box. We do not state here any time, as it depends upon the quantity of bitumen contained in the box, how the same is thrown up, and finally upon the colour which the grain will have to represent. It is for this last reason that we take three separate zinc plates and work the grain separately, as the yellow, for instance, requires a coarser grain, because it is the less visible colour. I also judge it wise, in order to create a more uniform grain, to give the plate three or four deposits of bitumen and to burn in after each powdering. There ought to be plenty of bitumen in the dusting box, and after the powder has been thrown up one does well to wait some time before placing the plate into the box. On this, I think it necessary to state that during even the slightest etch the smaller dots, which are scarcely attached one to the other by a string and which represent a good part of a grain, disappear. It is, therefore, necessary to create with fairly heavy powder deposits a grain uniform in its particles.

To examine the correctness of the bitumen coating we hold the plate horizontally up to the height of the eyes and towards the light ; now the plate ought to appear brilliant and not powdery.

After having obtained the grain, we proceed to the covering of the selections and to the etching, beginning with the yellow plate, continuing with the red and finishing with the blue. We have to etch very carefully and in the way common to half-tone etching and according to the outlines of the colour selections which guide us. As indicated above, the dots which form the grain are unequal, there will logically be some which are able to stand a longer action of the acid than others. This serious and perhaps unique obstacle can, it is true, partly be levelled by the way in which the grain is made, but the inequality, however little it may be, always will exist. And it is for this original defect—for the smallness of the molecules composing the grains which are too near one to the other—that we can hardly give it the depths required for a long run. I sometimes pour some liquid ink round the dot of the grain, dust with bitumen, burn in and etch the plate according to the case just like an ordinary half-tone.

In the high-lights one does better not to etch the grain away too much, as is usually done with screen dots, but to leave dots of medium size which can be cleared by roulettes, gravers, etc. ; or, better still, where the combination of the colours allows it, to entirely cut out the grain itself. This last hint is almost useless, as in most of the cases it is very difficult to arrive at any success in reducing the grain, just because of its inequality which makes it little apt to resist the acid. As mordant we have to use nitric acid mixed with substances which make it less violent in its action, and we have to be very careful that the solution be not too strong and, above all, that it does not heat when the plate is put in. If we proceed otherwise the bitumen will not stick to the plate, but will come off here and there, leaving spots which will prejudice the final result of the work. For proving and printing we have to use, on account of the smallness of the grains, rather a liquid ink.

This is, to sum up, a useful and inexpensive method of using the grain as an expedient in photo-engraving. It is a method which, without the entire employment of photography, allows us to colour any subject, from a simple half-tone or line reproduction.

On the whole I prefer the grain to the screen, and I predict a prominence of the former over the latter in the near future.

It offers us the means of obtaining a perfect colour rendering without any screen effect, and thus answers better to the requirements of the art which demands as much as possible the pure and simple reproduction of things as the eye sees them.

To-day, we see many important firms apply to photo-mechanical reproduction grained screens with best artistic and practical results, and we hope to see in the near future a more general use of this logical system in the field of art reproduction.

And the grain, be it as an expedient, as we have seen in this article, or be it as a fundamental means in half-tone reproduction, will become the subject of new studies and of new applications.

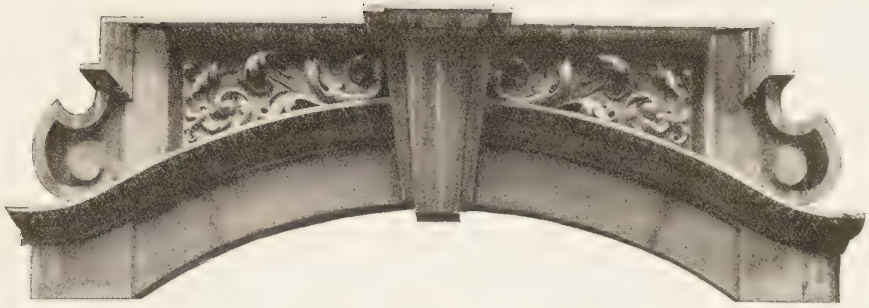
RIALTO, VENICE.

GARRATT & ATKINSON.

Photograph by
W. GAMBLE.

Carl Hentschel, Ltd.

Photograph by H. G. Grainger.



Some London Carvings.

By ERNEST MARRIAGE, F.R.P.S.

WHILST photography may be used to originate a decorative design, as of flowers arranged formally on a suitable background, it is still more useful for copying designs already in existence. Many people have not the skill to sketch, much less to invent, a pattern or ornament, but with a photograph which may be drawn upon, somewhat after the fashion of the slate of frosted glass of childhood's days, an architectural design, a piece of sculptured detail can often be converted into an ornamental pattern for some other handicraft without making too great a demand upon the technique of the plagiarist. It simplifies matters much to have the detail on a large scale, and, generally speaking, the pattern will be wanted larger than shown on an ordinary print, so if there is any length of the design it is better to work on an enlargement, whilst for a single motif a telephotograph may suffice.

On London buildings there are plenty of suitable bits to be found, modern work, of course, and rather prone to machine-like precision, a fault which the amateur draughtsman is not likely to accentuate. My illustrations all lie on the way from Fenchurch Street Station to the Royal Exchange. Perhaps that in Fen Court (see Fig. 1 and tail-piece) or in similar situations off the main highways of traffic, might be obtained during business hours on week-days, but it would be useless to attempt to photograph in Leadenhall Street (for example, the doorway to East India Avenue, see Figs. 2 and 3) unless very early in the morning or on Sunday; work would be frustrated by passers-by, if not by

FIG. 1.—DETAIL IN FEN COURT.

the police. But on Sunday there are not an inconvenient number of people on the pavement, and members of the force are tolerant spectators. Curious and interested probably; one policeman asked me what on earth I wanted to photograph that thing for, was I a stonemason? whilst others commiserated me on the weather; it was dull, certainly, but as there was neither rain nor sun to trouble me, I was content.

Fig. 2.—Detail in East India Avenue.

For detail work, beyond the ordinary architectural photographer's kit, consisting of a camera with a good rising front (see p. 38 of last year's "Annual"), a strong tall tripod, and one or two anastigmat lenses, two things are almost essential, a telephotographic lens and a tilting table. All the examples reproduced required different treatment. The head-piece was taken with an $8\frac{1}{4}$-inch lens raised very considerably; it is the top of a doorway, not a high one, and the camera was on the opposite side of the narrow court. The telephoto lens was no use here; a telephotograph would only have included one of the fancy scrolls. The tail-piece came next; it is on the side of a tall doorway (No. 2, Fen Court). To get the subject on a satisfactory scale, the telephoto lens and tilting table had to be used. The proportions of the subject were such that it would not fill a 5×4 plate—half the plate, in fact, would contain the panel almost on the same scale as the whole plate—so the telephoto lens and the camera extension were adjusted to get the image comfortably in on half the plate, a blackened card fitted in the camera to protect the other half, and the exposure made. Afterwards with an $8\frac{1}{4}$-inch lens a note of the position of the panel was made on the remainder of the plate, the card then protecting the former exposure. The result is seen in Fig. 1. It serves to show the difference in size between a photograph and a telephotograph.

Fig. 3.—Detail in East India Avenue.

The graceful carvings on each side of the entrance to East India Avenue out of Leadenhall Street (Figs. 2 and 3) are subjects that do not present any difficulty. The camera was placed opposite and just on the edge of the pavement. In that position the $8\frac{1}{4}$-inch lens gave exactly the amount of the carvings that

I wanted upon a $7\frac{1}{2} \times 5$ plate, but as the width was narrow compared with the length it was evident that both strips could, with the aid of the black card, be comfortably accommodated upon one plate. Theoretically, the lens should be placed opposite the vertical central line of the exposed portion of the plate; this can be done by means of the cross front. The absence of a cross front makes the placing of the subject on the plate more difficult; if the position is not quite right, the camera must either be moved bodily, which is troublesome, entailing re-levelling, etc., or the instrument turned round on the tripod and the back side-swung until it is once more parallel with the plane of the subject; this necessitates stopping down the lens.

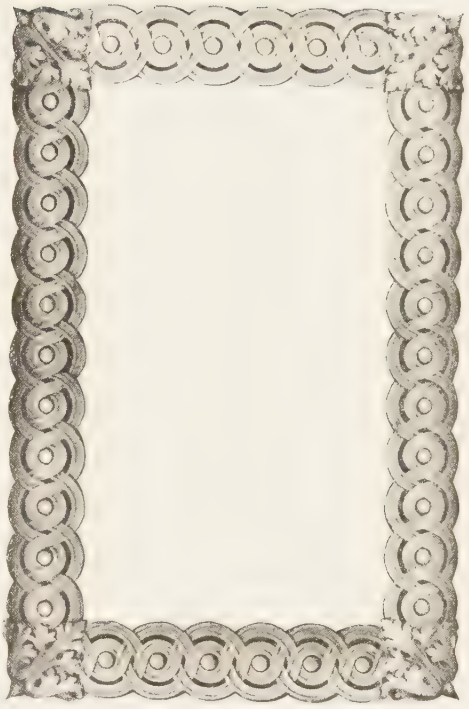


Fig. 4.—Panel.

The doorway of the Commercial Union Assurance Co. (used in Fig. 4) was taken from near the entrance to the Royal Exchange opposite. In order to secure equality of lighting as far as possible, and uniformity in the scroll work, a long-focus lens 16 inches (one of the components of the $8\frac{1}{4}$ anastigmat) was brought into play, and as time with an out-door architectural subject does not need to be considered, $f/64$ was the stop employed (*i.e.*, the $f/32$ of the doublet).

Fig 5.—Drawing made from Fig 2.

Reverting for a moment to the use of a protecting card and the sub-division of the plate, it is perhaps as well to caution photographers against an abuse of the system. Unless kept under proper control, there is a tendency to crowd too much into small space, to cut out the surroundings of a subject which are often secondary only in importance to the subject itself. I remember looking through a collection of prints, photographs of old manuscripts and miniatures for the most part, from negatives of the foreign size 13×18 centimetres (rather larger than half-plate), in which two and often four subjects were included; they were useful as notes, but valueless as book illustrations. The photographer who carries a telephoto lens will seldom want to use part of the plate, or a plate smaller than the size his camera takes, as he can, within a very wide range, suit the size and scale of the image to the full plate. My own camera

takes $7\frac{1}{2}\times5$ plates. At the start I used three double backs and had a changing box which held a dozen 5×4 plates, but for some years the latter has not been used, whilst in its stead I have three more $7\frac{1}{2}\times5$ double backs.

Now is perhaps the time and place to answer that policeman's question, "What on earth do you want to photograph that thing for?" It was *apropos* of the design at the beginning of this article. Well, it struck me that with a little blocking out and lettering it would serve some such purpose, but the explanation was rather too complicated to offer to Constable X.

The sprays of olive and oak lack boldness, and I fear will not work up well, though possibly a small piece of either, greatly enlarged, might be put to decorative purpose. This is often the case, I think, with modern work; carvings of the XII. and XIII. centuries are far more effective, though not necessarily as carefully executed or as true to nature. With the aid of an enlarging camera I have drawn a part of the olive spray on a larger scale (about $8\frac{1}{2}$ inches wide); a reduction of the drawing is reproduced in Fig. 5. The pattern in this case was traced with pencil on a piece of smooth paper, so that after the negative was made photography was not employed. The inking-in may be done with brush or pen, but best of all tools for the purpose is a curve pen, as it can be set for any thickness of line required and all the lines will be uniform. Such freehand pens are, I understand, obtainable from Penrose & Co.. A reference to Fig. 6 will explain its construction. The pen is curved and attached to a shaft which turns freely in the sleeve that serves for a handle. In use it is held nearly upright, and the point of the pen trails behind the handle after the manner of a castor.

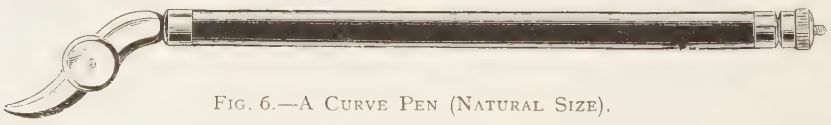


Fig. 6.—A Curve Pen (Natural Size).

The doorway of the insurance company's offices is easily converted into a border design for a page, an initial letter, a book cover or an embroidered cloth. In order to complete it, all that is required is a second print of the lintel, which is turned round and placed across at any suitable position. Sometimes, when the pattern is not so purely mechanical, it may be necessary to make a reversed print of the piece that is used to complete the figure, this is easily done in enlarging. It is hardly necessary to show a view of the doorway itself; the panel Fig. 4, has been built up from it.

One illustration has been given in line. I conclude this article with the Fen Court ornament in solid black. A contact print from the telephotograph was made upon bromide paper (the print should be weak rather than brilliant) and the design painted on it with Indian ink and brush. When the ink was dry, the print was soaked in a weak formalin bath to make the hand work insoluble; then the silver image was bleached with potassium ferricyanide and the print put straight away into hypo, washed and dried. A comparison between Fig. 1 and this tail piece shows the exact gain in size through the use of a telephotographic lens.

The Strand Engraving Co., Ltd.

STRANTONE

By kind permission of "The Gentlewoman, Ltd."

Peace.

Half-Tone Engraving Co., Ltd.

Photograph by S. G. Kimber.

In Canterbury Cathedral.

Pawson & Brailsford. *Photograph by S. G. Kimber.*

A City Portal.

Universal Process Engraving Co., Ltd.

Racing Yachts—Eight Metre Class.

Photograph by West & Son.

The Strand Engraving Co., Ltd.

By kind permission of West Yates, Esq. Inbs. J., Sherkin, Edwards & Co., L.

"STEANOTYPE"

A Portrait Study

from a Crayon Drawing.

The Coming Race:

A Review of some Possibilities.

By H. W. BRETHERICK.

IF one were but gifted with the fertile imagination and the facile pen of a Lytton what a field for prophetic romance lies before one at present !

The graphic arts—particularly in the domain of printed reproduction—progress from stage to stage of improvement with almost lightning-like rapidity, contradicting the law of evolution that growth towards perfection is slow. For it is within your recollection, Mr. Editor, how the art-science of photo-engraving has raced up the ladder of development, never turning back, each rung grasped representing some advancement only to be immediately discarded for another that is a further improvement. And not alone in the processes that we consider more particularly our own has this obtained, but in the sister crafts of photography and printing (both letterpress and lithographic) have the changes been almost as startling.

Ignoring the earlier discoveries in photography, we have reached the stage when pictorial records of passing events can be snatched in the fraction of a second; the pictures so obtained enabling the photo-engraver, with the resources at his command, to make reproductions in metal in a matter of minutes; in his turn feeding the mighty newspaper machines by which copies of the original record are scattered far and wide within an hour or two of the occurrence. So much by way of summary of the present attainments.

But what of the future ?

The ardent man of research in photography is close upon the discovery of pure photographic reproduction in natural colours—indeed, some claim to have reached that goal. Still the matter is yet more or less of a scientific curiosity. That a practical and commercial solution of the difficulty will be attained cannot long be deferred. The telegraphic transmission of photographs and drawings is a process of electro-photographics that is bound to be an established reality in a very little while. The successes achieved already warrant this expectation.

The process man is even now ready with his three-colour process to enable the printer to reel off pictures approximately true to the colour scheme of his original, though there is room for vast improvement in this matter. Printing machinery is rapidly being improved, producing results far ahead of what has been achieved, and it is in the realm of printing where one must look for some of the most startling developments in the near future. The advent of the Rotary Offset Machine is not only working a revolution in the lithographic world, but unless some equally revolutionary discovery is made in the letterpress section the latter will become the Cinderella of the printing world—delegated to do odd jobs or "short runs," if not actually rendered obsolete.

The newspaper of the future will not be printed from stereotyped plates ; all pictures will be in colours ; there will be no etching of blocks ; and the same

machine that will print the *Daily Ha'penny* will be quite as capable of doing the high-class catalogue, say, of a big jewellery firm !

How ? Nonsense ? Rubbish ?

Very good.

But who can confidently say that a three or four-colour rotary offset machine printing from the web is an impossibility ? Where is the nonsense in believing that improvements in the "high-light" process will give us aluminium plates of equal value with the finest etched half-tone blocks ? Is it rubbish to anticipate the time when the ruled screen itself will be an archaic curiosity ? Fifty years ago the big rotary newspaper machine, photo-engraving in all its branches, and the all-round present rapidity of production would have been called rubbish ; but many of us have lived long enough to learn the lesson that the nonsensical day-dreams of to-day often become the commonplace realities of to-morrow. May not the newspaper of twenty-five years hence be produced on what appears to us now just as marvellous lines as our methods would seem to the craftsman of twenty-five years ago ? Is it not possible—nay, even probable—that the newspaper of 1935 may be produced in some such manner as the following ?

The wireless telegraphy department will receive all news direct, and improvements in type-casting machines will set up the letterpress matter. The stereo department will be done away with, and a transfer department take its place which will lay down transfers (by machinery) of the type-set pages on to aluminium plates. Taking three-colour negatives will be as simple as present day Kodaking, and the wireless department will receive the illustrations in continuous tone and each one separated into the primary colours for three-colour reproduction. The process department, in the spaces left blank on the plates made by the transfer department, will lay down the key pictures from their "high-light," screenless negatives, providing extra plates for the three colours. The full set of plates will then pass to the big four-colour rotary offset machines and the run of millions will be completed in—to our present notions—incredibly short time.

The future before the offset machine is indeed great, and who shall, or can, say what revolutions in illustrative processes and their handmaids photography, photo-engraving, electrotyping and stereotyping, its perfecting may bring ?

"Full Speed."

Press Etching Co.

Photograph by West & Son.

A Small Electrotyping Installation.

By A. E. BAWTREE.

THOUGH this article is to some extent a continuation of that in last year's PROCESS YEAR BOOK, "A Process Shop for the Small Firm," the title has been somewhat altered in form, as it is probable that it is the large firm who will profit by it quite as much as the small one. I know of a large house, who installed a plant, which must have cost more than a thousand pounds, to turn out a volume of work, which could hardly have paid for the rent of the floor space it occupied. The little outfit about to be described would have answered nearly all their purposes quite well. It only needs a floor space of about one hundred square feet and costs all told only a few pounds.

It was in 1895 that I set up such a plant for a small firm, and it proved so satisfactory that they eventually put in a threefold set of the depositing part and worked it with entire satisfaction all the time I was connected with them.

Compression is our editor's command, and therefore without further preamble I will proceed to describe the various parts in order.

The source of electricity is the Daniel battery. It will consist of two glass jars, 10 in. high by 6 in. in diameter. Two porous pots 10 in. high by $2\frac{1}{2}$ in. diameter. Two perforated porcelain cones $3\frac{1}{2}$ in. in diameter. A supply of, say, one dozen zinc plates 10 in. by 2 in. by $\frac{1}{4}$ in. thick. Two pieces of thin sheet copper 10 in. by 8 in., and some strips of the same about $\frac{1}{2}$ in. wide. Half a hundredweight of copper sulphate and a Winchester of commercial sulphuric acid. Solder a copper strip to the centre of one of the longer sides of each of the copper sheets. Bend the sheets into portions of cylinders so that they drop into the glass jars a very easy fit. They will grow considerably before they are done with, and so, if made a tight fit, they will burst the jars. Copper strips are also soldered to the zinc plates, but it is not necessary to go into details over the battery and fitting it up, as these can be obtained from any elementary book on the subject. Suffice it to say that the perforated cones are to hold a supply of copper sulphate and will need replenishing about every eight hours. A certain amount of the solution must be drawn off each time to allow for the displacement of the crystals. A good plan is to stand the cells in a leaden tray and periodically draw off from it what overflows into it.

The depositing vat will consist of a stoneware jar 12 in. in diameter and 18 in. deep, containing a mixture of sulphate of copper 10 lbs., pure sulphuric acid 3 lbs., and water up to within one inch of the top. A wooden frame is fitted on to the top of the vat, having an opening 12 in. square in its centre and a raised piece of wood 2 in. high on two opposite sides of it. Through the centre of each piece of wood at right angles to its length is a slot one-eighth of an inch wide and $1\frac{1}{2}$ in. deep and a similar slot on each side of the centre one and 2 in. from it. Three strips of brass 18 in. long rest in these slots and a wooden cover goes over the whole to keep out dust. The anode is hung in the solution from the centre rod, to the end of which are clamped the strips from the battery coppers. The

moulds are suspended to the side rods, to the ends of which are secured the strips from the battery zincs. A strip of copper should connect the two mould rods together, but must not touch the centre rod. For anodes obtain four pieces of sheet copper 10 in. by 8 in. by $\frac{1}{8}$ in. thick, and when these are used up the thickened battery coppers will serve for future anodes. They must be made red hot before they are flattened out or they will crack. When renewing the battery coppers always throw away the battery solution.

The moulding press will be an ordinary office copying press. Pull the press down as hard as you can in the ordinary way and then give the handle one or two smart taps with a wooden mallet. These blows greatly add to the sharpness of the work. The pressure needed for moulding all depends on the skill of the moulder. I have seen a heavy-handed man break the column of a 6 in. hydraulic press in taking a mould such as I have obtained with ease on the copying press. For moulding trays sheets of brass 1/16th in. thick with strips of wood $\frac{1}{8}$ in. thick fixed round their edges with brass screws will answer well. The black-leaded moulds must be coated with copper in the first instance either by the process I described in the PROCESS YEAR BOOK two years ago, or by Penrose's iron filings method. To deposit the shells for eight hours will usually be found sufficient. The dilute sulphuric acid in the battery porous pots should always be renewed after thirty-six hours' use.

Now as to backing up. This will be done on the same copying press as the moulding. Have an iron mounting block free from screw holes or flaws fitted at one end with two wooden handles. In front of the copying press and with their upper surfaces level with its lower platen place two iron bars or firebricks and between them a good strong gas ring. Place the tinned shell in the centre of the iron slab and in each corner of the slab a piece of pica height brass. Place the slab over the gas ring on the supports provided until the solder melts on the shell, from which, for the sake of the press, all spirits should have been previously removed. To a ladle of melted and skimmed metal add lumps of cold metal till it is chilled to a pasty consistency. The solder used by plumbers for wiped joints is the most suitable composition for backing metal used as here described. Spread the mass over the shell, slide the slab under the press and screw down, but with no very great force. Some little skill is required in this backing operation or the whites in the block will be forced up by the pressure. Do not remove the pressure till the whole press is practically cold. If the matter is urgent the whole press may be plunged into a tank of water to cool it. The resulting block can be trimmed round with a hack saw and whites cut out with a fretsaw. It should then be ready for printing, requiring neither slabbing, turning nor planing.

I need not occupy space in enumerating the forms of usefulness such a handy little equipment would have for the printer, particularly in the provinces, away from the trade shop round the corner. I might suggest that it would often pay to just make a shell of a forme and store it away in an indexed envelope rather than put by a bulky forme full of useful type and furniture in case of a possible reprint order.

The little installations I have had to fit up have been collected from the stocks of various commercial houses, but possibly if these suggestions appeal to readers of this Annual, Messrs. Penrose might consider the question of putting up the whole equipment "complete in case, with art cover, and handbook of full instructions."

W. & G. Baird, Ltd.

Inks by J. B. Fleming &

Catalogue Colour Treatment.

The rich colouring of this class of goods makes them particularly suitable for colour reproduction

Plates for Colour Photography.

By CHARLES GRAVIER.

HOSPITAL OF ST. JOHN, BRUGES.

PRESS ETCHING CO. Photograph by GODFREY BINGLEY.

SINCE I gave in a former article the results of trials made with these plates, some improvements have been made in their preparation. I shall not give the historic details of the progress that has been made, but only make some remarks as to their qualities in general, for when the manufacturers are modifying their products it is well to guard oneself against stating precisely their respective qualities. As with ordinary plates it becomes possible to arrive at a medium quality and every operator will have his own preferences, more or less justified.

In France, where I live, we have actually three kinds of colour screen plates—Autochrome, Omnicolour and Dioptichromes. They enable direct colour photographs of a coloured subject to be obtained by one exposure only, with a fidelity of colour rendering which is often nearly perfect. The manipulations are simpler and, on the whole, quicker than for the ordinary plate (reserve being made for the use of the new automatic methods now applied to ordinary plates). The time of exposure depends upon the quality of the light, which is very variable if daylight is used, and the human eye cannot differentiate exactly such light, the same as with artificial sources of light, which are equally variable. If the duration of exposure is such as the manufacturers indicate in their prospectuses for the different plates, there is a medium time to be followed, because their trials are exact and rather weak than strong.

There is not for these plates a latitude in the exposure just as with ordinary plates, with which one can give, as we demonstrate daily, up to 100 times the normal exposure. One cannot depend upon a plate which has been exposed one-third of the proper time if a good result is to be obtained, whereas with an exposure double that recommended a result will be obtained which, though weak, can be made useful and pleasing by intensification.

As a matter of fact all these colour screen plates are based on the same principle. On a glass plate a series of triads of small, transparent screens are formed by different means, some of the screen particles being blue, others red, and again others green, and which have been juxtaposed more or less regularly. A layer of varnish protects these coloured particles, and on this layer of varnish the sensitive emulsion is put. The makers are always trying to improve this emulsion, especially with regard to its higher sensitiveness and its keeping qualities, two factors which cannot usually be obtained together.

Originally the Autochrome plates could be guaranteed to keep for two months, and it has since been extended by Messrs. Lumière to three months, but I have been informed that they can be kept much longer. My own opinion is, however, that when they are used only a few weeks after preparation the results will be better, and this is the opinion of practical workers.

Count Delmas, who has shown results obtained with Autochrome plates of from four to five months old, has proved that when exposing twice or three times the ordinary time satisfactory results were obtained, but the image was a trifle weaker. He is of the opinion that when the first development is not delayed more than two or three days, the results will be better than after a week. This we have said from the beginning, and, therefore, we have designed our portable developing box in order to be able to develop near to the subject photographed, or on the evening of photographing.

For developing Messrs. Lumière have adopted a methodical way of procedure consisting in only pouring into the dish one quarter of the necessary concentrated solution for a normally-exposed plate, the quantity of water remaining invariable. After twelve seconds from the immersion of the plate in the dish it is necessary to inspect the plate, and one can tell by looking through it when held near a light covered with paper called " Verida," which gives a weak and bluish light, whether the outlines of the image appear, and at this moment the remaining three-quarters of the concentrated developer are added. The time of appearance fixes the time for the stoppage of development, which instead of 2½ minutes may be 4 minutes, if the time of exposure has been too short.

Unless one can remember the exact colours of the subject which have been photographed this method is problematical. The manufacturers of Omnicolour and Dioptichrome plates ignore this method altogether, and warn their customers against the danger of looking at the picture during development. At any rate we would advise for portraiture or reproductions, of which the colouring has been noted, using at once the whole quantity of the normal bath, examining quickly after a minute, using the Verida paper for illumination to see how the image progresses, and keeping the plate in the bath a longer or shorter time as may be necessary. One must not forget that, just the same as with the image on an ordinary plate, the image is negative and greyish in the dish, no colour being visible. If a portrait, and the sitter has been dressed in black or in dark colours, the dress is hardly visible, and to get it into one's head that the same must appear at all costs would mean to lose the vividness of the clear colours.

As I am speaking of the vividness of the colours I would like to refer here to their " relative solidity " with regard to the agents used for developing. *Throughout the colouring of a subject, the series of colours is unchangeable so far as their number and their intensity are concerned.* This is what our colleagues and many operators should bear well in mind to make their very different opinions agree. The three manufacturers use as a developer metol and hydroquinone mixed, with the idea of making it serve again for a second development. Messrs. Lumière also mention pyrogallol, although advising the first-named, and I think they are quite right in doing so, although the uncertainty of preserving the ammonia solution at uniform strength troubles me ; I therefore prefer the Pyroreeb in which the alkaline solution is fixed and does not give off its ammonia until the moment that the pyrogallic solution is added.

In the first development the image has been brought out by blackening only the particles of the emulsion which have received an impression from the light having traversed the small coloured parts of the screen, which on account of this have been obstructed, and it is necessary to dissolve these particles. For this

purpose Messrs. Lumière suggest a solution of permanganate consisting of two grammes per 1000 c.c., which has been acidified with one cubic centimetre of sulphuric acid (pure) per litre of solution. The manufacturers of Omnicolour and Autochrome plates prefer a solution of bichromate of potash of 5 per cent. in water, mixed with 10 c.c. sulphuric acid per litre of solution. After trials made I prefer the solution of Namias, proposed by Stephan, which is composed of potash alum mixed cold (about 125 grammes per litre of water), to which is added 2 grammes permanganate of potash per litre. This solution hardens the layer of the emulsion. It is necessary every time the permanganate of potash is used to add to the water for the first washing 5 c.c. per cent. solution of commercial bisulphite of soda, which makes the picture clearer, at the same time dissolving the peroxide of manganese which has been formed.

In this state the image is coloured by the light which traverses the series of colour screens. If the subject has only clear colours it is preferable to preserve the image thus ; but with black or dark colours the coloured screens are obstructed, whilst they let through a greatly diminished illumination, which makes these tones milky. A second development will improve the general aspect of the image, but will make the very clear shades darker. Space fails us to fully explain this fact, to which we have been the first and, we believe, the only one to draw attention.

At any rate, it is only after the second development that the troubles begin, and if only one plate is available, which is rather valued, it will be wise to avoid this treatment.

Originally Messrs. Lumière insisted upon the necessity of an intensification and fixing.

Considering the results we have obtained since our first plate and the ill-successes met with after the second development, we warn our readers to act with great care in regard to the different operations to be gone through. Although the layer is more resistant, Messrs. Lumière do not now insist upon the second development, neither do the other manufacturers. The intensification is only recommended as a means of improving a plate which is weak through having been over-exposed or over-developed, and it is to be noted that the fixing bath is of no use if the image has not been intensified.

For intensification Messrs. Lumière indicate silver, the other manufacturers bichloride. The latter are wrong, as it is well known that silver gives much more intense images.

Thus it will be seen that apart from the use of permanganate and alum for dissolving the developed image after the exposure, the manipulations remain the same. We would just remind our readers that by performing the first two operations and drying with a fan one obtains on an Autochrome plate a dry proof quickly, and it is therefore much simpler and quicker than with an ordinary plate.

The gum dammar varnish with 10 or 20 per cent. benzine is too thick. It should be 6 per cent. or, better still, 4 per cent.

A Photographically Illustrated Book.

By THE EDITOR.

A MOST striking example of the usefulness of photography and photographic reproduction in book illustration is afforded in a work published last year by the Cambridge University Press, entitled "The Sculptures of Chartres Cathedral," by Margaret and Ernest Marriage. The latter gentleman will be recognised by our readers as a contributor to our Annual, and he is well known as a clever photographer who has made a speciality of architectural subjects. In the famous Cathedral of Chartres, which is often judged to be architecturally the finest in France, Mr. Marriage found unlimited scope for the exercise of his skill, and as a result of three visits made in 1901, 1903 and 1907 he has been able to collect together the necessary material for a complete monograph on the artistic glories of this magnificent pile. His aim has been to utilize the resources of modern photography to illustrate the Cathedral on a scale never before attempted. Books and articles innumerable have been written on this prolific subject, but its illustration was poorly and insignificantly done, so long as drawings and engravings were the only means of portraying its remarkable features. The best drawings cannot compete with photographs as accurate records of detail, and the personal equation of the draughtsman may and does lead to errors of interpretation. Those who may have the opportunity of comparing the drawings in previous works with the marvellously realistic photographs reproduced in this work will appreciate at once how great an advance has been made through the aid of photo-mechanical processes.

Taking advantage of the telephotographic lens Mr. Marriage has been able to secure views which it would have been impossible to obtain by ordinary means, and these views form perhaps the most valuable of the series. In fact, the author says that without telephotography the adequate illustration of such a building as Chartres Cathedral would be impossible.

Mr. Marriage recognises the impossibility of reproducing the magnificent stained glass, the glory of the Cathedral almost in equal degree with its sculptures, but he expresses the hope that the recent remarkable advances in colour photography are forerunners of greater achievements, and that before many years elapse the stained windows may be as accurately reproduced in all their colours as the sculptures can be in monochrome.

A particular feature of this book is the printing of the half-tone illustrations along with the text on matt paper, and Mr. Marriage has confessed to us that this happy idea was due to the success of our experiment in matt paper printing two years ago in our Annual. The exquisite softness of the half-tones in this Chartres book gives to the prints the effect of platinotypes, and along with the richness of tone the detail of the photographs has been wonderfully preserved. The blocks are evidently very worthy reproductions of the excellent photographs, and the printing calls for great praise. With the evidence of such a book before us it can no longer be said that it is necessary to print half-tones on highly glazed art papers, so objectionable to the artistic eye.

We reproduce two of the illustrations to Mr. Marriage's book, printed in the same way, so that our readers may judge for themselves.

We have only to add that Mrs. Marriage has written the text in an interesting and instructive way, and the book is further notable for the fact that the text is printed both in English and French, a half page being devoted to each language.

See article on page 72.

Photograph by Ernest Marriage.

Chartres Cathedral.

Central Door.
Porte centrale.

See article on page 72.

Photograph by Ernest Marriage.

Chartres Cathedral.

Statues on the right of the Central Bay.
Statues à droite de la baie centrale.

Vaus & Crampton, Ltd.

Photograph by A. E. Walsham

The Library, Queen's College, Oxford.

London & Provincial Reproduction Co., Ltd.

Photograph by Gale & Polden, Ltd.

The Stokehold of a Battleship.

Helios.

Photograph by C. E. Mögle.

Quenching.

Art Reproduction Co.

Walter Gilliard.

E. J. Akerman.

Photograph by E. A. Payne.

Light and Shade.

In the Newlands Woods, Cape Town.

Bromoil Transfers for Photo-Lithography.

By W. T. WILKINSON.

ENLARGEMENTS and contact prints made upon bromide paper of the carbon, semi-matt or glossy variety, from negatives in line and in dot, can be converted into greasy ink transfers capable of transfer to stone, aluminium and zinc.

The process in full is as follows:—The exposure, either contact or enlargement, must be as full as the dense parts of the negative will allow, the print being developed with pyro-ammonia, the formula of which is

Solution No. 1.

Pyrogallic acid	45 grains.
Metabisulphite potass.	45 grains.
Bromide ammonium	45 grains.
Water	10 ounces.

Solution No. 2.

Liquor ammonia '880	1 dram.
Water	10 ounces.

To develop, use equal parts Nos. 1 and 2, allow the developer to act until after the full density of image is obtained; if there are any signs of exposure in the whites the print is over-exposed and need not be proceeded with.

After the print is developed rinse in two or three changes of water, then fix in

Hyposulphite of soda	4 ounces.
Metabisulphite potass.	120 grains.
Water	20 ounces.

After fixing wash as usual.

When the print is thoroughly washed it is bleached in a mixture of

10 per cent. solution	potass. bromide	3	parts.
10 ,, ,,	potass. ferricyanide	3	,,
5 ,, ,,	potass. bichromate	8	,,
10 ,, ,,	hydrochloric acid	3	,,
10 ,, ,,	potass. alum	8	,,

The temperature of bleaching mixture (which can be used over and over again) should not be below 60°F. nor above 70°F.

When the print is bleached rinse in two or three changes of water, then soak in a 5 per cent. mixture of sulphuric acid and a 5 per cent. solution of zinc sulphate in equal proportions for five minutes, wash in five or six changes of water and dry.

When the print is dry it may be inked up with either Amphitype ink or with thin photo-litho transfer ink applied either with a pad of cotton wool or with a roller. When the coating of ink is dry, the print is soaked in cold water until it

is quite limp, then place in water at 65°F., and in about five minutes the transfer can be developed by gently rubbing with a tuft of cotton wool in exactly the same way as an ordinary bichromated gelatine transfer.

Pyro-ammonia is certainly not an ideal developer for prints upon bromide paper, but for the purpose of making transfers for photo-lithography the fact that pyro-ammonia gives an image in intaglio is the reason why it is the best developer to use for the purpose.

In making enlargements from screen negatives for poster work there are certain precautions that must be taken; all parts of the apparatus must be perfectly square and so arranged that they can be made perfectly rigid, the slightest vibration would spoil the enlargement.

The lens used for the projection must be at least a little longer focal length than the measure of the diagonal of the subject to be enlarged, else there will be danger of the dots at the corners being oval instead of round.

Daylight would suggest itself as best for making these enlargements, but it is uncertain, and it is difficult to focus by on account of the feeble luminosity.

The light reflected from two arc lamps by means of a curved white reflector gives very satisfactory results, but requires a great deal of room. The optical lantern, where the condenser does not exceed 12 inches in diameter, is perhaps the most convenient of all and with care will yield results perfect in every way.

The illumination for small enlargements may be incandescent gas or a small arc lamp of about one ampère fed from an ordinary incandescent circuit. For the largest work a 10 or 12 ampère arc lamp will be advisable, such as Penrose's have just introduced. It is self-feeding and has been designed expressly for clear projection work.

PLOUGHING.

GILCHRIST BROS.

Photograph by
KUNO REITZ.

An American View of Typography.

By EDMUND G. GRESS.

GOOD typography is not merely a matter of opinion, as many believe. Selection of style may be influenced by personal preference, but there is the difference of right and wrong in the proper and improper use of type, rule and ornament.

It is a more simple matter to explain why a piece of typographic printing is good, than it is to tell how to produce it. Good typography will show proper selection of type-face, of ink, and of paper. If more than one series of type are used, there should be harmonious relation in their design, as there should also be in type-face, ornament and border when used together. The tone should be similar, as ornament or border of grey tone with a type page of grey tone. The style selected should be appropriate and the arrangement should be symmetrical.

Acceptance of these facts does not tie the printer down to any one or two treatments. Mr. Jacobi once arranged a title page in ten different styles, all good, and the writer himself has designed a ticket in nineteen styles.

The trained designer of type effects knows that each piece of printed matter should be studied separately and treated according to its requirements. And he also knows that the art principles before mentioned cannot be ignored.

There is a general misunderstanding regarding the meaning of the word "art" as applied to typography. It does not, or should not, mean treatment in which ornamentation predominates. Rather it means the right type-face printed in the right ink on the right paper. It is possible to print well without using decoration, and to do so is the true test of a typographer's ability. Printing, after all is said and done, should possess human interest, but most printers overemphasize this element by extensive use of ornamentation and fancy type-faces, forgetting the message which the types are to carry.

The foundation of good typography is the selection of type-face. Here in America the best typographers consider that the Roman letter designed by Caslon I. meets most requirements for a good type-face. It is difficult to comprehend why so many British typographers ignore this excellent type-face and favour others that are not so meritorious.

The Caslon type-face just mentioned is one of the few that do not really need decoration or any other outside assistance in order to appear well. A single line of Caslon type alone on one of the artistic papers now so numerous could not, perhaps, be improved by more elaborate treatment. The typographer who has grown in wisdom and knowledge of art is bound to adopt simplicity as his ideal. He does not build designs that are fearfully and wonderfully made and pride himself on his accomplishment, as does a man who whittles a chain from one piece of wood, but rather his pride lies in another direction. He selects the type-face carefully and gives considerable thought to the paper and ink. The surface of the paper must be in harmony with the type-face and the ink must be of a colour and shade that will blend and bring out the beauty of the paper. In this manner the three elements are blended in one perfect whole.

Another thing such a typographer remembers is that the reader or recipient's attention should not be directed to the beauties of the printing, but rather the message should be carried in a manner so subtle that pleasure is given without one realizing it at the time. This refers, of course, to modern commercial printing that must have advertising value. A merchant has a booklet printed for the purpose of selling his wares and not to exhibit the skill of a twister of rules or mixer of tints.

My argument should not be taken to mean that printed matter should be confined to presenting the advertiser's message. A well-written advertisement will bring returns if poorly printed, but would bring more returns if well printed. It is business foolishness to spend a great deal of money and make use of the best brains to prepare a business argument and then have the message carried in a slip-shod, homely and unintelligent manner. This suggests a point that bears on the work of the photo-engraver. The artist and engraver may prepare beautiful plates and cover designs, yet the customer too often weakens at this stage and has his catalogue or booklet printed in an inferior manner. The type treatment should carry out the spirit of the engraved portions of a booklet or catalogue, and the man who designs the one should influence the designing of the other. Where the printer finds himself doing the type work for such a booklet he should endeavour to understand the motive that controlled the engraver and artist and follow out their ideas in the type work. Sometimes the design portion of a booklet is in strong lines, and the printer does his work with weak and fancy type-faces. Then again dainty engravings and drawings will be combined with strong, rugged type treatment, all of which is wrong and contrary to good taste and intelligent workmanship.

Another reason why the artist, engraver and typographer should work together is to preserve uniformity of treatment throughout a booklet or catalogue. The style of lettering used for the cover should have relation to the style of type-face used for the title-page and for the headings on the inside pages. One too often comes across booklets that have a cover design planned by an artist, a title page designed by the head compositor, say, and the remaining pages set by journeymen who happened to be out of copy, all working along different lines. This condition of things, altogether too common, is regulated to some extent by the employment in large shops of lay-out men. For this work is generally selected a progressive compositor who has studied and perfected himself in type arrangement. By means of rough sketches he indicates to the compositors definite arrangement of their work, and thus preserves unity of design.

Printing as a useful art has progressed considerably during this last decade, and a great deal of intelligent type work is now produced. The interest in commercial typography among printers is unprecedented in its enthusiasm and extent. The writer has seen many young printers awaken to the educational opportunities that were available, and these young men have advanced to the desks of foremen, superintendents and employers. The result is a condition of things in the printing business that is lifting the craft to a higher standard and giving it a new importance in the eyes of the public. The printer who can speak intelligently and authoritatively about the things that go to make up his business is bound to command the respect of his customers.

The time will arrive when it will be the rule for the arts and crafts that have to do with printing to work in close harmony. The best results will only be obtained when this condition comes to pass.

Press Etching Co.

Photograph by R. R. Tyrer.

Contemplation.

Glasgow Photo Engraving Co. *Photograph by Hugh Nisbet.*

On the Carron, Lanarkshire, Scotland.

E. Hamel & Co.

Photograph by Freckleton & Co.

Waterfall on the Lathkill, in the Village of Alport.

Northern Art Reproduction Co.

Photograph by S. W. Probert.

Here's Health.

Electric City Electrotyping and Engraving Co.,
Buffalo, N.Y.

Photograph by R. H. Murray.

Watching the Fishes.

Western Mail.

F. G. O. Stuart.

S.S. Suevic at Southampton.

Swan Electric Engraving Co., Ltd.

Photo by Gale & Polden.

Helios. *Photograph by C. E. Mögle.*

The Net-Maker.

THE CAVALIER

PAPER BY
ALEX. PIRIE & SONS, LTD.,
ABERDEEN.

PRINTED ON A ROTARY OFFSET MACHINE.
MAKERS:

PRINTERS:
JOHNSON, WYKES & CO.
LEICESTER AND LONDON

Offset Printing.

MUCH has been written in the past about the offset process, its application and possibilities, but now we are able to say what is actually being done owing to the almost universal use of offset machines.

As is often the case with new machinery, the uses for which it was primarily designed and intended have been tremendously augmented by its application to other ideas. For instance, the earliest designer of rotary offset machinery could not have thought of printing colour work or the style would have been quite different.

The constant contact of the inking rollers with a non-absorbent plate carrying moisture on its surface is not conducive to solid rolling and regularity of colour, and eventually the water, flowing much more readily than litho ink, must get the upper hand if not well controlled. Specimens of colour work have made their appearance executed in various degrees of quality, but it is undeniable that some firms are producing colour jobs with results and effect quite unknown in the past. This, however, is not the result of an accident, for whilst the register on a well-designed offset machine has never been in doubt, it is not every machine which is particularly applicable where heavy rolling and solid colours are necessary.

Excessive speed, which was advanced as one of the principal advantages, is in most instances being given secondary consideration, quality of printing being much more desirable to a large output with only medium results. The best classes of work, particularly in colour work, are not being executed at more than 1,800 to 2,000 impressions per hour, but the brilliancy and cleanliness of printing is far ahead of even flat-bed work.

As might have been expected, solid patches of bronze blue colour caused some inconvenience in the early stages, the blanket suffering rather badly in a long run, but experience has taught that by mixing the colour in a slightly different manner from that used for direct printing the trouble is immediately got rid of.

Badly or unsuitably grained plates carrying an excess of water have also had a detrimental effect upon the blanket, and it behoves every purchaser of an offset machine to make a choice of one with its damping arrangement as perfect as possible and situated in the most convenient position for the successful working of any job. This need not necessarily imply in the most convenient place for filling and emptying the trough, or for making the appearance of the machine attractive. It has been said that there are a large number of printers who are greatly influenced by beauty of design in a machine, but after all this is only the difference of ideas between one engineer and another, and should not enter into the calculations of a man who requires a money-making article and not an ornament.

During the past year some very fine catalogue illustrations have been produced in half-tone, this, of course, necessitating special blocks or plates, effects equal in appearance to collotype being produced at much less cost, the softness of the effect being particularly pleasing when produced on a dull rough paper.

An Idealogue's Appeal.

By A. MURRAY.

HAWKSHEAD.

CLARKE ENGRAVING CO. Photograph by F. T. EARNSHAW.

TO describe at length what ultimately led to a violent encounter is not my object in writing, nor might it serve any useful purpose to narrate the heated altercations which ensued since the practical outcome of it all did not further the cause of the scheme involved. But while frankly admitting that my co-operative effort resulted in a dismal failure owing to my inability to rise to what was expected of me, it by no means pronounces the imaginative theories of my worthy colleague as quite beyond the range of practical possibility.

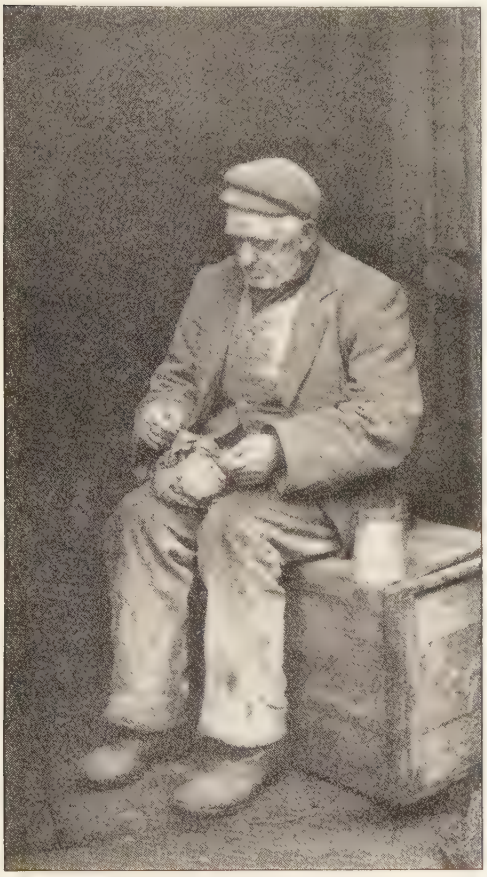
It is, therefore, my present purpose to place at the disposal of your readers the original communication containing his heartfelt appeal with the hope that it may engender kindred ambition as well as stimulate the inventive faculty.

"Worthy Sir and honourable co-worker,—If there is one thing to which I might trace my chronic attack of the fidgets I would put it down to prolonged and increasing anxiety over the deplorable condition of the graphic arts in their relation to the reproductive spheres. You probably exclaim in your unreflective way 'Why should this be thus?' Since you are aware that my possessions include many rare and valuable works of original genius, and with leisure to study and appreciate them, I can have but small desire for reproductive copies, however faithfully they may be executed. If these be your sentiments it just shows how far you fail to appreciate the true spirit of chivalry in the soul stirring regions of High Art. It may be all very well for me with my private gallery, but what about those who do not possess as much that will stir a single chord in their being? No! as things are and likely to remain but for the activity of super-sensitive aspirants, our works of art will not find their way into the homes and haunts of the people, for the simple reason that direct creative art costs far too much in the way of inspirational soul energy for broadcast distribution. The output of genuine quality is so limited that the artist, apart from reproductive processes, can work to satisfy only the privileged few—the comparative few who can visit our public galleries or those who can afford to possess private collections.

"Now, while I belong to the latter class, it would not detract from my admiration of an original work to know that hundreds of copies were being distributed in humbler homes, but rather it might ease my conscience a bit to believe that the message or story of the artist was not entirely hidden under a bushel, but being told from the house tops, or at least from their walls.

"To my mind every genuine work is worthy of reproduction, and could we but hope to raise the standard of execution so that the subtilty of its meaning and

message was not effaced in the translation I would take a delight in entering the ranks of the process workers myself. Even as things are I feel I must do something to relieve the strain. In looking through the late volumes of the PROCESS YEAR BOOK I am struck with the lack of initiative therein displayed. There seems too much clinging to old processes to make any rapid advance in reproductive work. Leaders are evidently required who can strike out on new lines and leave a trail behind them giving such original impress that any mere plodder might follow them. Hitherto I have been more of a brain worker myself and not aiming to accomplish anything special in the material or lower plane of things. Not having monetary considerations in view, I have not striven as I might to materialize my ideas, and now that I would make the attempt I naturally feel an inaptitude in bringing my theories within reach of the practical appliances necessary for actual experiment. My theories work well enough in my head, but I seem to lose control of operations when once they are extracted.



HIS DINNER HOUR.

Photograph by J. J. ROTHWELL.

"My object in laying all this before you is to solicit your aid in this most worthy cause, being well aware of your practical proficiency in adapting the most abstruse ideas for the accomplishment of your designs and being fully convinced within myself that I could keep such a colleague going full time, I feel persuaded that we should make a start with a few minor schemes by way of getting your hand in.

"To let you understand my methods, you are expected to grasp the points while I enlarge on the scheme, and as I proceed to give more or less vague detail you merely take notes as I go along so as to enable you to reduce the necessary operations to writing, giving the required technical definitions and manipulative directions with sufficient terminological exactitude, so that with a smattering of elementary chemistry and art education, along with a touch of intuitive penetration of the mysterious thrown in by way of anticipating the uncertainties of new ground, anyone can engage in the actual reproduction processes for himself.

"Just to give an example or two to show how we might proceed, take first my theory of a colour process by chemical selective affinity. You would be expected to take up the point where the required separative selection of tint is

effected by the agency of the light rays and to give details as to how the corresponding ether waves of the spectrum are made to regulate the colour and to resolve the pigments to the similar tones and tints transmitted optically from the original. My aim is to work this process in oils and to allow for a good solid body of paint, so that we may plane off sections of the subject like inlaid linoleum. Such a process has this advantage that if you fail to entitle your reproductions to adorn the walls you can still fall back upon a decorative effect for the hall floor. However, there is not much of an ambitious nature about this back-door outlet for our productions, and if I had merely myself to consider I would look upon such an alternative as most unworthy of my aspirations; however, I mention it to you as an encouragement in a new and uncertain sphere.

"But to pass on, I might give you a word about my colour stimulative development tank. This is for producing complementary colour negatives direct in the camera, but is rather a cumbersome process to work, since the exposure has to be made from the glass side of the plate with the film in liquid developer ready to act under the stimulative influence of the various light rays transmitted from the original subject. Of course, I do not expect you just at once to be able to jot down the chemical analysis of the developer required for such a process, because I can conceive that you might possibly have to experiment a bit before committing yourself to definite instructions for publication.

"I hope that the foregoing may prove sufficient to indicate the lines upon which we will work, and now that I begin to reflect I feel my fidgety attack impelling more and more to action. Great results depend on you not failing me in this hour of need. I am yours to inspire to nobler effort,

PICTORIUS QUICKSOUGHT."

A Scotch Washing.

Press Etching Co.

Photograph by
Robert Braid.

British Photo Engraving Co. *Photograph by Stantial and Allerston*

Mont aux Sources.

Hill & Co.

Venice.

Photograph by S. L. Coulthurst, F.R.P.S

Acme Tone Engraving Co., Ltd.

Drottning Victoria.

Photograph by Frank & Sons.

Art Reproduction Co.

Photograph by West & Son.

Russian Battleship "Czarewitch" at Spithead.

Gatchell & Manning, Philadelphia.

Inks by Morris & Bolton, Ltd.

The Concert.

Antoine, Louis and Mathieu le Nain.

From the Private Collection of Mr. John Wanamaker.

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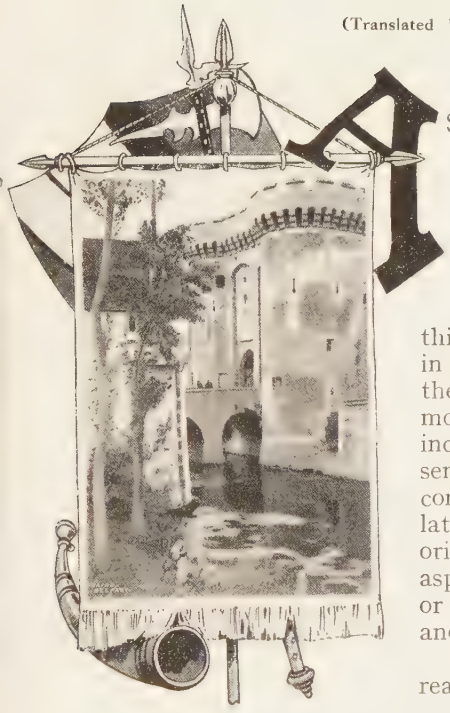
On the Production of an Asphaltum Compound of Relatively-High Sensitiveness.

By PROF. E. VALENTA (Vienna).

(Translated by Major-General Waterhouse, I.A.)



La Porte Guillaume, Chartres.

W. & G. Baird, Ltd. Photograph by Ernest Marriage.

AS obtained in the market, ordinary Syrian asphaltum has a comparatively low sensitiveness to light, and this has greatly hindered its use for the production of pictures on stone, metal plates, etc.

For many years attempts have been made to increase the sensitiveness of asphaltum to light, and two different methods of attaining this object have succeeded. One of them consists in treating the raw asphaltum with ether, by which the less sensitive components are removed and the most sensitive remain. The other consists in an incorporation of sulphur by which the two less sensitive α and β components of the resin are converted into the third really active γ resin. This latter method* of sulphuration of asphaltum originated with me and consists in melting the asphaltum with the requisite quantity of sulphur, or dissolving it in a solvent of high boiling point and heating it with sulphur in an invert condenser.

In this case the following are the principal reactions taking place.

(1) The α resin takes up sulphur and is transformed into the β resin.

$$2\ C_{32}\ H_{46}\ S + 2S = C_{64}\ H_{92}\ S_3.$$

(2) The β resin is changed, with evolution of sulphuretted hydrogen, into the γ resin, the really sensitive component of the asphaltum.

$$C_{64}\ H_{92}\ S_3 + 5S = 2\ C_{32}\ H_{42}\ S_2 + 4\ H_2\ S.$$

As is apparent from these equations, the sulphuration of asphaltum in this way is accompanied by a copious evolution of sulphuretted hydrogen. The simple fusion of asphaltum with sulphur is difficult to carry out without carbonizing the former. Consequently sulphuration by the wet method is preferable. For this purpose the asphaltum is dissolved in pseudo-cumol (boiling point 170°C.,

* *Photo:Korrespondenz*, 1891, pp. 314, 342, and Eder's *Jahrbuch für Photographie und Reproductionstechnik*, 1892, p. 241.

309·2°F.), the solution mixed with 12 per cent. of sulphur in powder and heated in an invert condenser, so long as sulphuretted hydrogen is freely given off, which requires about three or four hours. The solvent is then distilled off. The black residue is dissolved in 25 parts of benzol and used for the preparation of the lithographic stone or metal plate on which the copy has to be made.

When the operation has been carried out with the necessary care, the product obtained is relatively very sensitive. In the numerous trials made with it, it always gave me very satisfactory results, but the preparation requires very exact working, otherwise it may easily happen that besides it an entirely insoluble substance is produced which lessens the output. Moreover, the asphaltum easily becomes burnt while the cumol is being distilled off, which on the one hand causes loss and on the other a deterioration of quality by the admixture of decomposition products of the sulphuretted asphaltum. Besides this, the great quantities of evil-smelling sulphuretted hydrogen fumes given off require a stove or chimney-place with a good draught, under which this work can be undertaken, and make the sulphuration an exceedingly troublesome and unpleasant task. These are certainly the reasons why the sulphuretted asphaltum has not come into such general use as it deserves on account of its high sensitiveness to light.

At the present time a good deal is being done in various reproduction establishments with asphaltum films. The asphaltum is generally purified in the expensive way with ether already mentioned; many also use it unpurified. I have now, with a knowledge of the need for a sensitive preparation of asphaltum and full appreciation of the difficulties hitherto involved in the production of sulphuretted asphaltum, endeavoured to carry out the sulphuration in another way, and have, in fact, succeeded in working out a simple process which gives reliable results and a relatively highly sensitive product.

In doing this I started from the fact that many compounds containing hydrogen when heated with sulphur chloride SCl_2 take up sulphur, with disengagement of hydrogen, which combines with the chlorine of the sulphur chloride to form hydrogen chloride.

Carbon disulphide is a suitable solvent for the asphaltum, it dissolves it easily and does not decompose the sulphur chloride. Trial showed that the reaction could be carried out, as I thought, at a moderate temperature. By warming the asphaltum dissolved in carbon disulphide with sulphur chloride, there was a strong evolution of hydrogen chloride (chlorhydric acid) and the reaction was soon completed. If too much sulphur chloride is taken, the sensitive γ resin is apparently also attacked, in which case the whole of the asphaltum becomes insoluble and, naturally, useless. After several trials to ascertain the proper proportions of sulphur chloride to obtain a highly sensitive product, without producing large quantities of insoluble asphaltum and so greatly lessening the output, I found them to be 6 to 8 per cent. of the asphaltum used.

The apparatus used for the preparation of this new asphaltum compound consists of a glass retort holding about $1\frac{1}{2}$ litres, connected with an ordinary Liebig's condenser (with *cork* stoppers—not caoutchouc) and supported in a water bath. This consists of a pot fitted inside with a sieve-like bottom and closed above with a porcelain ring through which the neck of the retort projects.

The retort is charged with 100 grammes of powdered Syrian asphaltum, which is dissolved in five or six times the quantity of carbon disulphide. After solution 6-8 grammes (4-5 cm^3.) of sulphur chloride, which has previously been diluted with 20 cm^3. carbon disulphide, is added in small quantities well shaken-up and, after the retort has been connected with the condenser and a bottle placed

below the outlet of the retort to receive the carbon disulphide distilled over the water bath, is heated until the contents of the retort begin to boil. Chlorhydric acid is evolved and carbon disulphide begins to come over. When the re-action is complete about a third of the carbon disulphide is distilled over. When the distillate is clear and no more chlorhydric acid is evolved, the distillation is stopped. The contents of the retort are then poured into a sufficiently large bottle and diluted with 2 litres of anhydrous benzol, with which the retort had previously been washed out, so as to get all the soluble asphaltum into the bottle. The solution so obtained is finally filtered and is ready for use. For lithographic purposes a further addition of about 2 per cent. of oil of lavender is made. The sensitiveness of films of this preparation on zinc or copper was compared with that of chromated albumen films, and the comparison showed that the sulphuretted asphaltum came very closely to the latter in sensitiveness. With three minutes' exposure in the sun under a line negative developable images were secured. The asphaltum images are developed with Neustadt turpentine with or without Russian oil, which has been found necessary with thicker films and consequently longer exposures.

"I Spy."

E. Hamel & Co.

Photograph by
Freckleton & Co.

Model Work Benches for Aerograph Workers.

By CHAS. L. BURDICK.

LITTLE RED RIDING HOOD.

E. HAMEL & Co. Photograph by FRECKLETON & Co.

OWING to the cheapness with which small editions of decorative colour printing can be done by the aerograph, we predict a very extensive use of the method among printers, and information as to the construction of work benches may be of use to some of the readers of the "Annual."

When we began the sale of the aerograph for pottery work, now fifteen years ago, we were required to meet the difficulty of spraying poisonous colours. We then designed the first exhaust air-work benches for colour spraying, which have since been generally adopted the world over. Where the factory laws are very strict, as in Germany, the exhaust air-work benches are in use everywhere. It may be as well to say here that for the "A" pattern aerograph, which is used by artists for drawings and finishing photographs, there is absolutely no need for an exhaust work bench, but for the larger sprays and especially where several are working in the same room, draught boxes are very desirable. They keep the air which is breathed more pure, keep the work cleaner, and we should recommend them for every factory installation.

Compressed air, when allowed to escape from a small opening, will project itself in a certain direction for a long distance, but the law does not reverse itself for exhaust air; no matter what the orifice, the air will be drawn in from all sides equally, hence it is necessary to make a hood over the bench to keep the air travelling away from the workers and carrying the colour with it. As the worker will require a good light it becomes necessary to make this hood of glass. This with a fan and an air passage leading to the bench is all that is essential, but a few simple points of construction must be observed.

1. The air shaft up to the first opening in the bench should have a sectional area equal or slightly in excess of the fan area; thus, for a 24-in. fan the cross section of the air shaft should not be less than 20 in. by 24 in.

2. It is important to keep your fan as near to the work bench as practicable, and make as few turns or corners in the air shaft as possible.

3. The total area of the opening in the benches should be approximately the same as the area of the fan, and the size of the openings should be graduated, those nearest the fan being smaller by, say, 10 per cent., than each succeeding opening.

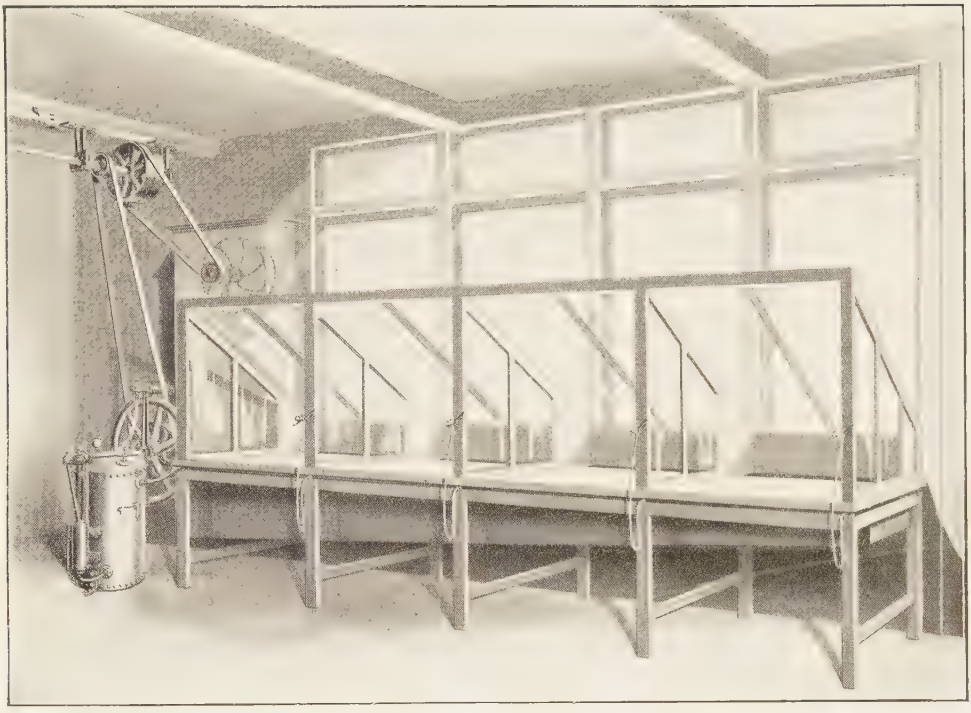


Fig. 1.

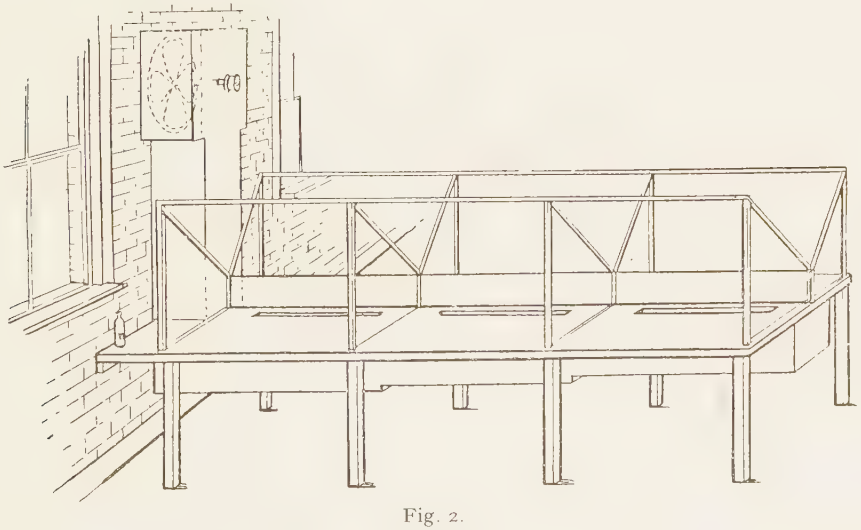


Fig. 2.

For the purpose of cheapening the construction the air shaft may be reduced in size from the end of the bench nearest the fan to a sectional area at the farthest end, not smaller than the area of the last opening.

The size of the fan may vary somewhat with the character of the work ; for light and innocuous colours, such as spirit anilines, a fan which would move 500 cubic feet of free air per minute for each worker would meet the requirements ; for heavy or poisonous colours a fan giving a much larger number of cubic feet of free air is recommended.

The space allowed for each worker, as well as the depths of the benches, may vary from 2 feet to 3 feet 6 in., according to the character of the work to be done. For large cards or large articles more room must be allowed than for small.

Our illustration No. 1 shows a bench for four workers placed under a window on a side wall. Fig. 2 shows a double row of benches back to back, running at right angles from the wall and illuminated from windows in the wall. This is the cheapest and most economical of space. The construction of the air shaft is very simple and economical, as the bench itself serves for the top wall of the shaft. It is, of course, very important that there shall be no cracks or opening of any size in the air shaft.

There have been devices made for collecting colour with a view to saving it, but you may take it as a proved fact that no economy is effected in this way and the efficiency of the exhaust is diminished.

Pipes of zinc or tin may be used for the air shaft, but owing to the difficulty of fitting openings and making corners the expense will be found greater than for a simple shaft of thin boards which is equally efficient in every respect.

In making work benches, as in nearly every other branch of manufacture, simplicity should be the key-note. The more simple a machine is the more efficient it will be and the less likely to get out of order.

An Interesting Letter.

E. Hamel & Co.

Photograph by
Freckleton & Co.

Mogul Varnish.

By ARCHER CLARKE.

Design and Block by Students of L.C.C. School of Photo-Engraving.

WE have all made the same statement, "However did we manage without it?" and this applies to the motor bus, the telephone and to Mogul varnish with equal accuracy.

The northern continent of America is credited with sending us bad weather and the Colorado potato pest. That's to its debit. Now for the credit side. We have the Levy screen, fish glue and the subject of this article—Mogul varnish.

The makers indicate thirteen varieties or kinds for different uses. These are variously described as paints, compounds and varnishes. It has four varieties of consistency—thin, thick, hard, waxy, is either a quick or slow drier, and, lastly, has seven good unique properties, such as acid-proof, rust-proof, damp-proof, fume-proof and waterproof, and makes a fine insulator for electrical work. Lastly, it is odourless. This last claim is made by the makers. The English samples I have used—about three gallons—must have caught the odour of the sea in transit from the U.S.A., as there is more than a faint suspicion of the ocean greyhound. Personally, I rather like this said smell, it is unlike any of the others that float about the process worker.

Amongst the thirteen varieties referred to, is the acid and the waterproof. This has been used with much success in the coating of lead-lined sinks, coating the large wooden photo trays or dishes used for liquids, also for recoating some large enamelled iron dishes, 30×24, sold by the maker as acid-proof. When we discovered a series of holes being eaten into the metal it seemed evident that the English acid must have been stronger than the German manufacturer used as a test.

For blocking or duffing out either work or spots, and strengthening weak places on wet collodion negatives for printing on metal, especially if for the lithographic press, it is superior to anything else we have tried. The next best is photopake; this is used to go round very fine work. The large blanks being filled in with Mogul varnish, thinned with naphtha so that it merely leaves a thin film of a yellow brown varnish on the plate when used to supplement the film of collodion, if weak in deposit, and it can be further diluted if needful.

In practice we find the glass bottles that have held "Gloy" very suitable, as they are not liable to be tipped over. Two are used, also a swan quill and a fine sable pencil. In a bottle labelled No. 1 some Mogul photo or litho varnish is poured, and about double the quantity of naphtha. In the other, No. 2, naphtha only. No. 1 is used for any part of the negative that just requires a little additional stopping, but most important is it to wash out the brushes in No. 2 when finished and so soften them when next required; this can be used when making up fresh varnish and clean naphtha for No. 1 bottle.

The Mogul can be used for half-tone metal plates instead of stopping-out varnish; this saves an extra bottle and brushes for half-tones.

Bottles, baths, funnels and jars can be marked No. 1, No. 2, hypo, etc., as the case may be, and are easily distinguished, especially if several persons have to use the same articles.

In an issue of " Penrose's Process Work " a page is given up to " Blocking-out negatives," and after trying all the methods advocated there, I still adhere to the use of " Mogul " for negatives that have to be in optical contact with the plate glass of the printing frame during exposure to the light, as half-tone and line negatives must be, to obtain satisfactory results. This applies equally to printing on zinc, aluminium, or copper, either for letterpress, lithography or photogravure.

The Chief Lithographer, Hydrographic Office, Washington, D.C., Mt. Gregor, has given the manufacturer of " Mogul " a personal statement, from which I can only make a short extract :—

" I tested your product in connection with

(1) Original drawings on stone,

(2) Photo-lithography and transfers,

(3) Transfers from engraved copper plates,

and after printing 1000 copies failed to see any signs of weakening of the work," . . . He finishes with " Always mention the fact, it firmly holds the work."

The foreman to the Mutual Label and Letter Co., San Francisco, California (now Schmidt Litho Co.), Mr. Gus Soderwell : " I have used Mogul litho varnish for five years in our establishment and find it a great time-saver, we could not well do without it."

Mr. G. R. Hildyard of North London, under date October, 1904, writes : " I had a sample of Mogul given me, I tried it on zinc and find it resisted the acid well ; I use it for my process, and a trial order of one or two gallons is required ; please send invoice, etc."

Referring to the large enamelled iron trays 30×24, these were used for developing, fixing and washing large negatives, they all gave out more or less, but the worst one was that containing copper bromide ; it was well cleaned, coated both in and outside with Mogul ; the holes had thick brown paper, also coated and applied about ten minutes after coating. The treatment next day was to recoat the dishes, giving the brown paper an extra rub ; this was done last year and the dish is still in use, but if these or other dishes give out or any of the porcelain dishes are broken, they would be repaired with a linen fabric ; in fact, a couple of 16×14 dishes that are covered with cracks in the enamel are now waiting the treatment.

If you have a floor, counter or a wooden sink, use the " Mogul " repairing compound according to makers' instructions, and until they are worn out you will certainly find it the most economical way of obtaining a damp and waterproof article, even a common cardboard plate box " Moguled " makes a temporary tray, and if linen cloth or bleached muslin be used in and out you really have a practical and lasting tray or dish for developing or fixing.

In an emergency the ordinary " Photo " or Litho Mogul can be used instead of waiting for the " Repairing compound," but perhaps three coats will be required instead of two.

In practice I can recommend that which carries the label " Mogul Lithographic Varnish," obtainable from Messrs. A. W. Penrose & Co. The reader cannot do better than send for the literature and the price.

If the camera bellows lets in light or needs repair, give it a thin coat. The latest use of Mogul was to enamel my bicycle. It has proved a success.

Carl Hentschel, Ltd.

Photograph by Alfred & Marie Bracewell.

Study of a Head.

S. A. Cattell & Son.

S.S. "Carthage."

Photograph by Frank & Sons.

Harrand & Fuller.

Photograph by Frank & Sons.

Launch of the S.S. Franconia.

New Art Engraving Co. *Photographs by Dr England*

Swiss Mountain Scenes

Photochrom Co., Ltd.

Negative by H. W. H. Palmer.

A "Palmertype" Half-Tone.

Enlarged 2¼ times from original negative.

Making "Process" Screen-Negatives without a Separate Screen.

By F. C. CURZON.

STILL LIFE STUDY.

HALF-TONE ENGRAVING CO., LTD. Photograph by E. W. JACKSON.

AS new methods are always interesting to study, and, in the process trade especially, the ability to carry through the latest ideas is one of the points on which the existence of one's business often depends, I would like to place before your readers the details of a process which by its simplicity may soon become a widely worked method for half-tone reproduction. The "Palmertype" process (of which Mr. H. W. H. Palmer is the inventor and patentee) is a means whereby the negative first made of a portrait, landscape or other subject becomes the actual medium for the production of the bichromate metal print.

By its use the costly necessities of studio, electric arc lamps, process cameras and engraved screens are all swept aside.

It becomes possible with only the equipment of an ordinary field, or hand camera (without amendment) to make an exposure of, say, some important public event, hasten back to the dark-room and produce in a few minutes the half-tone screen negative.

The development, fixing and drying in formalin or other suitable medium can be carried out in fifteen minutes, the printing on a previously sensitized piece of metal should not occupy more than seven minutes, and etching and finishing (with the advantage in many cases of no fine etching being necessary), in a "Levy" blast machine, bring it forward as a method by which the entire production of the half-tone block is brought to the absolute minimum of time.

The essential point lies in the fact that the operator instead of carrying an ordinary plate in his dark slide possesses one which has a special dry plate emulsion coated upon its inner side, while the side exposed to the lens bears upon its surface a cross ruling or "Metzograph" grain screen of opaque pigment.

In exposure the same effect is obtained as would be procured by the interposition of an engraved screen, and, as the image falls upon the reverse side no prism or reflection mirror is required, the film being correctly reversed in position without the necessity of stripping.

Operators using dry plates for process work will have knowledge of the frequency with which the negatives are (if correctly exposed and developed) passed on to the metal printer without any necessity for "cutting" or intensification, and for reasons explained later in this article the possibility of "cutting" being required is still further reduced.

The first item in the education of the would-be process operator is that he has to acquire the ability to accurately calculate the screen distance required for a given mesh of screen upon a given subject and its size when copied. This is possibly the most tedious feature met with during the whole term of his apprenticeship.

The need of this knowledge and its working in practice is quite eliminated when using "Palmertype" plates and upon this reasoning: That though in copying a *flat* field through a *flat-focus* lens the minute adjustment of the screen distance from the surface of the sensitive film is essential, when photographing direct an object in *natural plane* with a field focus lens this matter of distance has no longer to be brought into consideration. The only variation necessary is made upon the plate during manufacture and in this manner: That the coarser

A "Palmertype" Half-Tone.

Made direct from a snapshot negative. Exp. 1/30 second, aperture f/11.

Block by
PHOTOCHROM CO., LTD.

Negative by
H. W. H. PALMER.

the screen upon the one side, so the greater the thickness of the glass, the plates varying in depth from one-twentieth of an inch for fine screens to one-eighth of an inch for the coarsest, the intermediate screen meshes being supplied upon plates of accurately calculated proportion between these two sizes.

In practice the exposure is found to be much shorter than one would suppose when comparing the prolonged exposure necessary to obtain a screen negative in the ordinary manner.

In the latter method the light rays, after leaving the lens, have to penetrate one thickness of the engraved screen and are then split up by the cross ruling or "Metzotint" grain, after which they travel through the second glass of the screen and across an open space before projection on to the emulsion surface.

In the " Palmertype " plate the rays are at once separated by the cross ruling and conducted by only one passage *through glass alone* direct to the surface of the emulsion.

It is due to this fact that the resulting image gives much less exaggeration of screen " toneiness " in the high-lights than that which is obtained by ordinary screen operating, and consequently there is a greatly decreased need for " cutting " upon the negative film or of fine etching upon the metal plate.

The absence of the intermediate operations of making a print from the negative and copying through a screen as is now the ordinary procedure, explains the pronounced sharpness and depth of detail shown by blocks made by the " Palmertype " process.

The two illustrations accompanying this article are not given as specimens of an artistic view, neither are they to be considered as the best result that can be obtained ; as a matter of fact the negative was one of the first half-dozen made, but they are included to show the possibilities of working the process by a snapshot taken with an ordinary camera.

The smaller illustration is a portion (made by contact) of a half-plate negative coated with 150 screen. The exposure was one-thirtieth of a second, aperture F/11 at 10.30 a.m., in rather dull light, the lens having to be raised one-and-a-quarter inches on account of the camera being placed down on the hillside.

After the exposure the plate was " flashed " for one-fiftieth of a second with aperture F/64.

The plates are, of course, supplied in the mesh of screen which the finished block is required to print in, but in the case where an operator is using a half-plate camera and requires a block, for instance, $12\frac{1}{2} \times 9$ inches in seventy-five screen, he would employ a plate of 150 screen and enlarge the result by four times area.

To obtain results other than by contact size a bromide print is made by contact and this is copied, either enlarged or reduced, by using an ordinary plate, the screen shown by the bromide print being perfectly satisfactory when printed upon the metal.

The larger illustration given here is the same section of view as the smaller block, but enlarged to two-and-a-quarter times area, the above described method being adopted.

The " Palmertype " process is now being adapted for direct three-colour half-tone work, the three sensitive plates being supplied with the screen ruling of each at the angle generally used for this work. Given that the three negatives are correctly exposed, the resulting plates, with only machine etching (*i.e.*, entire absence of fine-etching), should produce facsimile representation of the colours of the object photographed.

CUTTING CORN.

ARC ENGRAVING CO.

Photograph by
J. E. TYLER.

The Future of Three-Colour Printing.

By W. M. NOBLE.

THE TWINS.

LASCELLES AND CO., LTD. Photograph by GILL & SON.

TO everyone cognisant of the inner working of three-colour houses, one fact stands out in sharp relief, and that is that the printing as distinct from the block-making tends to become more and more the most important part of the business, in fact the printing part of the two or three largest colour process establishments is now the most remunerative department in the business, and this is a state of things that will become more marked with every year that passes, until in the not very distant future, the only colour printer of process blocks will be the colour-block maker, because the process houses are infinitely more adapted for the work, no matter to what degree a printing establishment pure and simple might specialise in colour-printing. For the advantages resting with the process houses are both several and powerful, and need only to be stated to convince every practical man that we are now witnessing the gradual concentration of tricolour printing into the hands of those most naturally fitted to do it.

Now what are these advantages, and how do they operate ? In the first place a process house, in making a block to which a printing order is attached, can afford to lose on the actual block making ; they can afford to take such pains, and put in work of such quality, that it would not pay them to do in the ordinary way, for here the printing will enable them to recoup. If a customer orders a set of blocks from a process house, and gets them printed at an ordinary printer's, he certainly will not get blocks that have cost more than he has paid for them, if the process people can help it ; but if he comes along and says how much for 10,000 first-class reproductions of this, the process house to ensure giving complete satisfaction, can, within limits, afford to ignore the cost of the actual blocks ; the total cost to the customer might be the same either way, but he has got better value for his money.

But it is in the practical and technical working of a tri-colour establishment where one is best able to see the great advantages possessed there. Broadly speaking they are twofold, firstly they know the original, and so know exactly what the plates are aiming at, and secondly, the means they possess of altering at will the plates. We shall see how these advantages work out. A process firm receives an order for a set of blocks from a customer, and in due course submit him a proof ; he finds it satisfactory, accepts the blocks and forwards them to a printer, who endeavours to match the blockmaker's proofs as accurately as possible. If the printer's finished prints are equal to the proofs he considers he has done well indeed, and very rightly so, for he could have done no more.

Hood & Co. Ltd.

Glossa

...m an Autochrome by Dr. W ...

But if this same job had been printed where the blocks were made, it is quite possible that the prints would have exhibited a considerable improvement upon the proofs, because, having the original before them, they would know whether the blocks or proofs were capable of any improving modification, and if they were the improvement would be carried into effect. For instance, suppose when the job was proofed, the yellow had been pulled a little too weak, when it came to the run the blockmaker would know just how much stronger it should be printed, and further we know that many jobs are passed where the blocks are capable of quite marked improvement, and in cases of this kind the plates would be looked over and rectified before going on the printing machine.

Again, who does not know how apt a job is to come differently the second time it is proofed, despite the fact that the plates have not been touched ? How many jobs are proofed but once and the plates sent in to the customer ? Printed at an ordinary printer's the prints, as it were, take their chance of turning out as well or worse than the blockmaker's proof, but printed at the process establishment the prints are examined at each of the three stages, and alterations made in the plates if considered beneficial. So that the practical effect to a customer of having his job printed by his blockmaker is that the plates obtain a final revision under the exact conditions at which the job is to be run off. These instances refer to single subjects, but when we come to deal with a forme containing a number of plates the advantages become still more evident. Printers are continually having trouble in this direction, and it is a trouble they can do very little to obviate.

As the blockmakers proof each job separately, they are enabled to adjust the strength of the inking with which each separate plate is pulled. One job may be pulled fairly full, another quite spare and so on, the great object being to get the desired effect in the shortest time, the result being that it not infrequently happens that sets of plates are sent in which the printer would be quite unable to accurately match, should he have to include that set in a forme with others.

A glance at the working of a tricolour process shop will make this more clear. A yellow impression comes out of the proofing room, and is submitted to the etcher's inspection ; the proof is carrying a fair normal amount of ink, but the etcher comes to the conclusion that a stronger pull will better suit the original, accordingly the proofer is requested to send out a stronger impression ; this, let us say, is passed ; the yellow is therefore run off at a strength above normal. The yellow of another job comes out, also pulled with a right quantity of ink, but in this instance the etcher decides that a spare impression will best suit, so a spare pull is asked for and supplied ; the proof passed, that yellow is run off at a strength below normal, that is to say, with probably not more than one-fourth the amount of ink used for the preceding job. Let us assume that the next two jobs are run off with a correct normal amount of ink, and further let us take it that the key proofs we have seen taken are sent to a printer, who proceeds to print them together in one forme. To match the whole four yellow impressions sent by the blockmaker he finds impossible, so he does the best thing he can, he matches those two impressions which were pulled at a fair strength ; the result is that that subject which was pulled above strength is now printing too weak, while the one proofed spare is now printing far too strong. With such a variation from the key proofs in the yellow, the result cannot fail to be poor, even though no similar state of things be disclosed when the red and blue formes are dealt with. All the poor printer can do is to anathematise the blockmaker, which, if forcibly done, has no doubt a certain value as a vent, but is of no practical importance.

Now if this same forme, with the same key proofs, is given to the machinist at the process shop, what happens ? An impression is submitted to the chief etcher, who carefully compares it with the key proofs, and he at once sees that one subject is printing too weak, another too strong ; he marks the alterations he considers necessary, and an etcher proceeds to alter, in one case to etch, in the other to burnish, so rendering it possible to obtain the right result with one even inking.

To these great practical advantages may be added others. The process house is always ready and equipped to deal with accidents to plates, which, happening elsewhere, might conceivably cause serious delay, while a still greater advantage may be found in the fact that both etchers and machinists are in continual touch, which, in a thousand subtle and indirect ways, is always helping toward the desired end.

In conclusion let me repeat that I am strongly of opinion that colour process-houses that do not print, and colour printing-houses that do not " process " are doomed ; colour reproduction houses that both print and make will alone survive. The next decade is pretty sure to witness a competition more intense than has yet been ; rule of thumb has everywhere got to go, and the scientific spirit of the times will more and more insure the working of that simple and inevitable business law—the survival of the fittest.

SISTERS.

HALF-TONE ENGRAVING CO., LTD.

Photograph by W. GILL.

The Testing of Process Lenses.

By A. J. BULL.

Initial Design by L.C.C. School of Photo-Engraving.

THE tests applied to a lens should be such that they ascertain its fitness for the particular class of work which it has to perform. A lens to be used for wet collodion work should bring the extreme violet and such ultra-violet light that it passes to a sharp focus over the plate to be covered, but it need only do this at medium and small apertures. Then the general visual focus must coincide with the violet focus, as the focussing is done visually at larger apertures than those used for the exposure. On the other hand, three-colour work demands that all visual light shall be sharply focussed and, further, that the images formed through the red, green and blue filters shall be of exactly equal sizes in order that the printing blocks may register.

Now, although it is usual to test lenses visually, much may be urged against this practice. The result of a test by the most visible light is not necessarily any criterion of the performance of a lens with the extreme violet, while a visual test with the latter is impracticable, owing to its low luminosity. It is, therefore, desirable that in any test applied to a lens designed for use with wet collodion the usual procedure of practical work should be followed in that the focussing should be done visually, while the photographic record on a wet plate should be examined and not the visual image.

For three-colour work the most important point is that the three images should fit each other exactly. This can be ascertained by an examination of the lens for distortion with the three different coloured lights employed, and although this may be done visually the photographic test is really to be preferred, as the violet and blue light recorded in one of the negatives is still very dull to the eye. The definition with the three different coloured lights can also be better inspected on the negative for the reason that the examination of all the negatives is made under the same conditions and is independent of the effects on the eye of colour and fatigue; further comparison with a standard is also readily made.

The Baptistery, Canterbury Cathedral.

Photograph by Hill & Co. Godfrey Bingley.

A specially designed camera for the photographic testing of lenses intended for use in process work has been constructed for the L.C.C. School of Photo-engraving. In this instrument the whole camera can be rotated over the second nodal point of the lens through a wide angle, so that the image of a test object may be brought to different parts of the photographic plate. To test whether the three images are of the same size a test object is used which consists of three long strips of red, green and blue coloured gelatine, across which some fine wires are stretched at intervals. One negative of this is made, and if on it the images of the wires are perfectly continuous and sharp the lens may be considered suitable for three-colour work.

Flower Market, Amsterdam.

Northern Art Reproduction Co.

Photograph by W. Gamble.

Gilchrist Bros.

Ruins of Baths of Caracalla, Rome.

H. Rheinlander & Co.

Photograph by Stantial and Allerston.

Tugela Valley, Natal.

Photograph by M. R. Tozer.

Expert Engraving Co.

Where the Raindrops leave no Trace.

"Western Mail," Cardiff. *M. J. Ridley.*

Llandaff Cathedral.

Wald. Zachrisson.

Inks by Shackell, Edwards & Co., Ltd.

A Swedish Landscape.

Three-colour print direct from Lumière Autochrome.

Paynetype.

By ARTHUR PAYNE.

SINCE this process was first introduced at the beginning of 1910, it has naturally shared the fate of all revolutionary patents, meeting with much criticism and some opposition. But what is perhaps not such a common experience and one more pleasant to record, several minor improvements have been adopted by various workers who are using the process, and these are valuable inasmuch as, in combination, they achieve that sense of reliability and security that is required from any process by all practical men.

It may, therefore, be of interest to review the present position of the Paynetype process in the light of the experience gained during the past year.

Line Work True to Scale.

Perhaps what is one of the most valuable features of this process of photo-engraving was suggested to me in the course of conversation with M. Malvaux, of Brussels. We were discussing the loss caused by large negatives, such as are used in the printing of maps, shrinking when "stripped," and it immediately occurred to me that here the Paynetype process possessed a valuable qualification for such work. Subjects photographed direct upon the metallic plate are obviously not distorted in the slightest degree, but must be true to scale, and therefore this process deserves serious attention for line work requiring a degree of accuracy such as is met with in the case of maps, or in the registration of line colour jobs. This is a feature that deserves consideration by the photo-lithographer, who can photograph the subject direct upon the zinc plate from which the image is printed, and so avoid the use of transfers.

An Improvement in Development.

It has been found to be a decided improvement to utilize the well-known tanning action of the pyrogallic developers to increase the insolubility of the developed image in the gelatine film, and the steps which led to this conclusion are not without interest.

Some time ago when selecting a suitable developer, I considered the claims of pyrogallol with its tanning action, but decided to use a non-tanning developer such as glycin, trusting to the action of the bichromate hardening solution rendering the gelatine film quite insoluble. Subsequently Mr. Fishenden developed his plates with pyro-soda with the object of dispensing with the use of the bichromate solution, and it was found that the hardening action obtained in this manner was apparently equal to that obtained by the use of the glycin developer followed by the action of the hardening solution. Further experiments which I made led me to prefer to use pyro-ammonia, which has a strong tanning action upon the gelatine image, but this effect I increase by an immersion for one minute in the bichromate solution, and thus obtain a remarkably tough and insoluble gelatine resist.

The formula for the pyro-ammonia developer is given below. It is a rapid developer giving a fine black deposit and possesses the additional attraction of being cheap, a gallon costing about sixpence.

Pyro-Ammonia Developer.

Stock Solution.

Pyro	1 ounce.
Ammonium bromide	½ ounce.
Potassium metabisulphite	1 ounce.
Distilled water to make	10 fluid ounces.

For use add five drachms of this stock solution to sufficient water to make twenty fluid ounces, and to each ounce of developer add four drops of ammonia ·880, immediately before using.

Many operators object to using the pyro-ammonia developer and prefer to develop with pyro-soda, for which I give a suitable formula. Equally good results are obtained with it, but this developer is rather more costly than pyro-ammonia.

Pyro-Soda Developer.

Stock Solution.

Pyro	1 ounce.
Potassium metabisulphite	¼ ounce.
Distilled water to make	10 fluid ounces.

A.

Stock solution	2½ fluid ounces.
Distilled water	17½ fluid ounces.

B.

Sodium carbonate (cryst.)	2 ounces.
Sodium sulphite (cryst.)	2 ounces.
Distilled water to make	20 fluid ounces.

For use, mix equal parts of A and B solutions.

It is interesting to note that various workers have tried nearly all the well-known developers with satisfactory results, equal to those obtained with glycin, but not so good as those obtained with pyrogallol.

An Improvement in Making the Plate.

Mr. G. C. Laws has introduced the use of liquid Amphitype ink in place of the litho ink and varnish formerly used in the process of reversing the image by the ink method. It possesses the advantages of being of uniform consistency, is always ready for use, avoids waste such as was formerly caused by more ink being mixed than was required for use, and being liquid it readily penetrates the finer lines and dots on the plate.

The amphitype ink is smeared over the cold plate by means of a pad of cotton wool and distributed with a composition roller, the plate being rolled until a uniform even coating is produced and the solvents have evaporated. On a correctly inked plate the image is faintly visible through the layer of ink. The plate is immersed in alcohol and immediately developed with a pad of cotton wool in a similar manner to the development of an albumen print.

A Small but Important Detail.

Experience has shown that it is highly desirable to dry the gelatine film by holding the plate *film side uppermost* over a gas ring or hot plate. The necessity for performing the operation in this manner was discovered by an operator who was accustomed to dry the films by whirling the plate film side downwards over a gas flame, with the result that the alcohol easily penetrated the gelatine film and destroyed the resist. This trouble ceased directly the plates were dried film side uppermost. It was probably due to the surface of the hardened gelatine film being dried before all the moisture had evaporated, a small portion consequently being imprisoned between the gelatine film and resist, thus assisting the alcohol to penetrate the film and attack the resist.

The Question of Cost.

There appears to be a total misconception of the cost of working this process in the minds of many people who apparently compare the price of the plates with those of glass dry plates, totally forgetting that the zinc is included, and that there are a number of expensive chemicals saved, to say nothing of the saving of labour and of electric light, gas, insurance, etc. Moreover, they do not allow for the rapidity of the process doubling the output and so halving the standing charges which, from what I have learnt, appear to be by far the most costly item in a process engraver's costs.

The conclusion I have arrived at in this matter may be briefly expressed as follows. Either the process engraver is making a fortune out of line work, which is quite contrary to popular opinion, or the costs which have been quoted against my process are not correct. One or the other of these deductions must be right.

According to careful calculations and tests that have been made, the cost of making Paynetype line blocks works out at three farthings per square inch for material and labour, and of this amount one-third of a penny is absorbed in the cost of the plate.

Answers to Some Objections.

I am pleased to be able to say that, though every conceivable objection to the use of this process has been raised, I have not met with one that was unanswerable. This fact gives me confidence. For I know that for work within its capabilities, such as newspaper half-tones, and line work up to a degree of fineness represented by a line 1/250th of an inch thick, the process is entirely satisfactory and will, sooner or later, be universally adopted.

One of the most frequent objections quoted against the process is the necessity for employing men trained in this particular work. This objection is a self-raised bogey that does not actually exist. It only dwells in the imagination, as is proved by the fact that most process workers who have used the process had not the least difficulty in carrying out the manipulations. Should it be considered necessary, however, Messrs. Penrose & Co., Ltd., will be delighted to train any process worker free of charge, or they will introduce trained men to prospective employers.

Some of the workpeople have an unfounded fear that the adoption of the Paynetype process will considerably curtail the amount of labour at present used in the preparation of process blocks, and will in particular lead to the abolition of the metal printer. As one man tersely expressed himself, "he even prefers being a printer to selling matches." There is here, somewhere, a subtle compliment to the process, which I leave to the intelligent reader to discover. As a

matter of fact, however, these fears are groundless, for the printer may easily do a portion of the work in the preparation of a Paynetype plate, and it is a well-known law of economics that every simplification of work with a corresponding fall in price to the consumer increases the output and consequently leads to an increased demand for labour.

Turning to the more valid objections dealing with the process itself, one of the most persistent is that as blocks are often smaller than the stock sizes of Paynetype plates there must be a serious wastage of metal when the unused margins are trimmed. In the first place, it is doubtful whether the prospective waste of metal is at all serious, but even if it were, there is no reason at all why the plates may not be cut to the correct size, before they are exposed, by means of a guillotine machine used in the dark-room. And the adjustable bars in the process dark slide readily hold any irregular sized plate. These small plates may then be soldered together for etching, most etchers being expert in soldering up a number of plates. Moreover, by the exercise of a little ingenuity, it is possible to avoid cutting up at all, and by the use of a black cardboard mask held in the screen holder of the camera to obtain several pictures on one plate.

Some people object to using the process because no negative is made, and as they occasionally have to make two prints from one negative they think that there must be a loss when two negatives are made direct on metal instead of only one on glass and prints made therefrom ? In answer to this objection I say that surely it is possible to expose two separate Paynetype plates, or make two exposures upon one plate, and this in much quicker time and more economically than making one glass negative and two prints on metal.

The process is also viewed with distrust by some operators because of the absence of all operations akin to those usually employed by them when " cutting " or intensifying. As a matter of fact there is no necessity for work of this description, and the business man will see here a considerable saving in both material and time.

The question of the probable loss caused by spoiling Paynetype plates is one which is frequently raised, and it is therefore interesting to note that experience teaches us that, actually, very few plates are spoilt, certainly not more than the usual percentage met with in the albumen printing process. But with the intention of meeting all reasonable objections, Messrs. Penrose & Co., Ltd., have made arrangements with the makers of the plates, whereby they are prepared to make an allowance for spoilt plates that are returned to them in stock sizes, if the metal base is not damaged.

I conclude this brief *resumé* of the experience gained during a year's working of the process, by expressing a wish that those workers who may discover any important or minor improvements will kindly communicate with me, so that their work may be considered in the light of accumulated experience, and help, in a future year, to enrich that storehouse of current process knowledge, Penrose's Annual, in return for the information gained therefrom.

Grout Engraving Co.

Photograph by J. H. Powell.

"A Woodland Path."

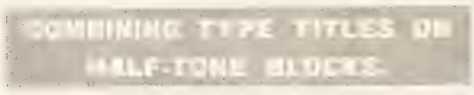
A Method of Combining Type Titles on Half-Tone Blocks.

By BURMAN NORTON.

ANY practical method of combining in one printing an impression which has the appearance of going twice through the machine will, I think, be interesting to readers in the printing craft. Although this article is mainly for the perusal of block makers, the method is likely to be a practical pointer to others, if modifications be adopted to apply the same idea on the lithographic principle. I give examples showing the utility of method applied to suitable subjects.

The present method of titling blocks is through the medium of the engraver, cutting on the finished plate, which will appear as white letters, and if black letters are required the title is painted in solid before etching. The method given in this article has many advantages, being quicker, neater and a practical way of combining in one plate the necessary lettering.

Example No. 1 illustrates white letters on the tint and is the most straightforward method.



Example No. 2. This method gives a solid letter, and entails printing from two negatives, but not more difficult if care is taken as to registration for position, etc., in the printing on the metal.

COMBINING TYPE TITLES ON HALF-TONE BLOCKS.

The procedure for the application of Example No. 1 :—

Have the compositor to set up in type the required matter and get a good pull on white enamel paper. Photograph this impression, using a wet plate for preference, intensify with lead ; then from this negative make a transparency, using a lantern plate, which ensures a perfectly clear positive. If slightly veiled, clear with ferricyanide and hypo, swill, place in a formalin bath and dry off.

When dry cut round each title with a sharp knife and strip. By painting on the title with a camel-hair brush a solution of 4 minims hydrofluoric acid in 1 oz. water, the title will frill up, and can be taken on the point of the brush and allowed to rest in a saucer of water until ready for applying to the negative. As an adhesive for the gelatine strip title on the screen negative use " Kaye's coaguline cement," thinned down about twice with a solution of acetic acid 1 oz., alcohol 1 oz., added to the cement as bought from chemist.

You now take the screen negative and mark the horizontal lines with a pencil just where you wish the title to appear, then take a camel-hair brush, charged with coaguline, and paint above the horizontal line, then lay the gelatine strip title on with a brush, stroking one way, brush charged with cement to ensure flatness, etc. If this is done neatly there will not be any trouble in getting contact when printing on the metal. This title prints white letter, as Example No. 1.

Procedure for black letter on light ground, as Example No. 2 :—

Take a tracing of your original, using corners as register marks, drawing on the tracing horizontal lines the exact position you wish the title to appear. Get a good white cardboard and mark off with carbon paper the position of titles on board, not forgetting to put the register marks on also. Now take the title impressions and paste on the positions so marked; the half-tone negative can be made *and, without moving the camera,* make a line negative of the titles ; print the line negative first in enamel, develop, and stain with aniline, *without burning in,* sensitize again and print on half-tone image ; see that the register marks exactly coincide, which will easily be visible, if you have used a strong aniline colour. The enamel can now be baked in and you will have a neat combination plate of line and tone work, the finished proof will be satisfactory, and the method found the quickest and most practical.

There are many uses for this method, as the same procedure could be utilized for line borders and ordinary line and tone work.

HARVESTING.

GARRATT & ATKINSON.

Photograph by
J. E. TYLER.

"Baskertype" Tint Plates.

A Substitute for Metal or Wood.

By FRANK ADAMS.

DURING the past few years printers have taken advantage of the use of tint plates as an aid to artistic effect in half-tone work. It will be generally agreed that a harmonizing tint judiciously used in conjunction with a half-tone plate of a study or view often lifts an otherwise mediocre effect into a "thing of beauty."

Seeing how cheaply tint plates can be made or purchased, wonder is that this means of additional effect is not even taken more advantage of. If proof is required to back up my assertion of the artistic value of the introduction of tint plates for half-tone work, I would advise a perusal of such publications as "Photography and Focus," "The Amateur Photographer," etc. The most appealing of the illustrations of these weeklies are those which have been embellished with a tint.

Having made a special study of the various methods employed in producing tint effects I have pleasure in recounting this experience for the benefit of printer readers of the "Process Annual."

Myself a printer, ever on the *qui vive* to find the simplest methods of producing artistic results, it was some twelve years ago that I made initial experiments with various substances for making tint plates. Any surface that would take ink and would stand the required impression to print satisfactorily was tried, with varying results.

The best quality ivory card was used fairly successfully but its wearing properties were limited. The card was mounted on to a piece of type-high wood and after the design was cut the surface was treated with two or three coats of glue. In some instances where a plain flat tint only was required, I managed to obtain up to 2000 clean impressions, then the face of the card would peel away and if further impressions were required a fresh plate had to be cut!

Patent leather was the next material to come in for experiment, and although it was possible to obtain a greater number of impressions from this, the cost of the material was rather heavy; and again, it was extremely difficult to cut any lines or details cleanly. Furthermore, it was not possible to sketch direct on to the surface—a most serious disadvantage.

Feeling certain that a substance could be found that would be free from the foregoing imperfections, I was determined to continue the experiments until success was secured. I was well aware that ordinary linoleum was being used by many printers for the production of extra large poster letters, it being cheaper and easier to cut than wood, and also having the advantage of printing with a solid face, this being mainly due to the resilient nature of the material.

At this period I practically tried every make of lino. on the market in an endeavour to find a brand with the best printing surface and one that would stand the largest number of impressions. Finding that the number of runs obtained was largely influenced by the particular material of which the mount consisted, wood mounts were discarded at an early stage of the experiments as

being too hard and, therefore, not yielding to the impression of the cylinder or platen of the machine. A further disadvantage of the wood mount was that in a great many instances, after a few impressions had been taken, the linoleum would have an unhappy knack of lifting from the wood base and encircling itself around the rollers, much to the annoyance of all parties concerned. Thinking that this result might be due to an inferior quality of glue being used in mounting, stronger adhesives were tried, but without minimising the difficulty.

Linoleum had yet another drawback in the small number of impressions obtainable. On one or two occasions as many as 3000 runs were accomplished, but in the majority of cases the plate would show signs of wear after 1400 runs, having to be replaced should further impressions be required.

The final outcome of the experiments has enabled me to put on the market a special printing surface, namely, "Baskertype," which has all the foregoing imperfections removed. This is put up by the "Baskertype" Co., Eastbourne, and is sold in a complete outfit, which enables any printer to make tint plates in a few minutes at the cost of a few pence. The special features of "Baskertype" are that it will take any ink or pencil transfer, or can be sketched on direct, is type high, and will stand from twenty to thirty thousand impressions.

The tints for the illustration plate shown in connection with this article were cut in half an hour at a cost of 1s. 9d., including material and time for cutting.

Progressive printers should investigate the merits of this new and simple means for adding an artistic touch to their productions.

The Crater of Vesuvius.

Gilchrist Bros.

Photograph by C. S. Best.

Inserted by permission of Stephen Bindon.

An Artistic Drawing Room.

Half-tone Illustration, Embellished by Two "Baskertype" Tint Plates.
(*See Article "Baskertype Tint Plates."*)

Marshall Engraving Co.

Photograph by F G O. Stuart.

Pleasure Gardens, Bournemouth.

Sessions & Co.

Photograph by Stantial and Allerston.

The Source of the Tugela.

Photographs by F. G. O. Stuart

Acme Tone Engraving Co., Ltd.

Wintry Aspects.

Ornamental Lake, Southampton.

On Southampton Common.

Hill & Co.

Photograph by J. E Tyler.

Sheep Washing.

Carl Hentschel, Ltd.

Photograph by Alfred & Mail. Bi...

Portrait of Miss Maude Bracewell.

The Illuminant for Copying in Colour Reproduction.

By A. J. NEWTON, Principal L.C.C. School of Photo-Engraving and Lithography.

WHEN we are reproducing a coloured subject our object is to render it as exactly similar as possible if in three-colour, or the values exactly proportional to the luminosity of the colours if it is to be in monochrome. But coloured objects appear differently in different lights to the same eyes, and also different to different eyes in the same light, though as it is not probable the latter cause of difference extends to more than about three per cent. of the population we can afford to neglect it, and consider our reproduction as intended always for eyes of normal vision. Therefore, the first thing we have to decide is, in what sort of light will the copy be compared with the original? The answer is as to the vast majority of cases, daylight, and daylight is unquestionably the best light with which to photograph the original, all other things being equal. But daylight, in large towns of certain countries especially, is very inconstant and the speed at which work is required does not permit of any uncertainty. Moreover, to utilize daylight properly requires suitable location and this again is frequently impossible on account of the price paid for the work not allowing the occupation of spacious premises having unimpeded access of plenty of daylight. Since, then, we cannot work with daylight in the cellars that frequently serve for photo-engravers' studios, resort must be had to artificial illumination. None at present has any claim to consideration for our purpose, except electric light, and so far only the arc light, though the progress being made with metallic filaments leads us to imagine that some other form of powerful light than the arc may yet be produced.

Of the electric arcs there are two main types offered for use in photographic work, *viz.*, the open, in which the carbons are consumed in the open air, and the enclosed, in which the carbons are consumed while enclosed inside a glass cover. The carbons used in the latter are sometimes solid, burning with little luminous flame, and sometimes "cored," that is, the centres are filled with certain mixtures containing metallic oxides, which cause the flame between the arc to be more luminous and, according to the case, of a different colour.

The enclosed arcs burning solid carbons have recently come very largely into use, because they are most economical in current consumption, for certain classes of work, and require less attention since the carbons burn away much more slowly.

Now we must turn our attention to the sensitive surface on which the image of the coloured object is to be formed in the camera, and this will either be a dry

plate or collodion emulsion, since wet collodion is not sensitive to any colour but violet and blue. We started with the assumption that it is desirable to reproduce our subject as the eye sees it, and therefore we shall want to record on the plate only what is seen by the eye. But unfortunately no plate is sensitive to light in the same way as the eye, and in fact all plates are particularly sensitive to ultra-violet rays, which excite no sensation in the eyes or brain, and they are also sensitive (or can be made so) to the infra-red or heat rays coming from a region of invisibility at the other end of the spectrum. Professor R. W. Wood has shown that objects photographed by means of either kind of these rays are depicted very differently from our accustomed vision of them.

If the radiations from the electric light and daylight were the same, we should still have to remember that the effect on the plate is not the same as on our eyes, and knowing that we have to get an image on the plate equal in effect to daylight on our eyes, we have to consider which of the arcs is best to use. The accompanying spectrum photographs give some idea of the effect on a panchromatic plate of the various regions of the spectrum, of daylight, the open arc and the enclosed arc. All rays beyond 4000 A.U. are invisible, yet it is seen that the open arc has more effect on the plate in this region than daylight and the enclosed arc still more.

Spectra of various light sources on a Panchromatic Plate.
Exposures not strictly comparable with each other.

The reason the enclosed arc has been found advantageous in general practice is that it emits a larger number of ultra-violet rays than the open arc. It does not do so because it is enclosed, but by reason of its long arc, and it has to be enclosed because a long arc will not remain alight unless it is protected from draughts. Now as the plates, particularly wet collodion plates, are specially sensitive to ultra-violet, and as in black and white copies as a rule (but not in the case of Chinese white), the absorption and reflection of these rays is proportional to the black and white respectively present, it may, of course, be

economical to use this form of lamp for doing black and white work, in fact, if we had a lamp emitting no light at all, but only ultra-violet rays it might do equally as well for black and white. But it would be no good for colour work, because we want to photograph light reflected that we see, a three-colour photograph being made, for example, by photographing separately the blue light, the green light and the red light reflected from the original, and any radiations except these likely to have any effect on the plate must be rigidly excluded from it, or else the colour values of our reproduction are liable, indeed almost certain, not to correspond with the same colours on the original as the eye sees them.

Therefore, a lamp which is good, merely because it is richer in ultra-violet rays for black and white work, is not necessarily good for illuminating coloured originals, and it has to be decided whether after shutting off the ultra-violet, which the filters do, such lamps are even as economical as the open type.

As a matter of fact it was early discovered that there was disadvantage in using the ordinary enclosed arcs, and so the cored "flame" carbons were introduced in order to shorten the exposure. But the trouble of having to change the carbons in order to get an appropriate coloured flame for each filter and the rapid clouding of the glasses when burning such carbons led to the introduction of an improved type of lamp to burn carbons giving a brilliant white flame, and so constructed as to draw off most of the products of combustion which hitherto when burning cored carbons deposited a dense film on the glass covers. Such a lamp was submitted to us, and a series of tests were carried out on three types of lamp to determine their relative efficiency for three-colour work.

No. 1 was the ordinary enclosed arc burning solid carbons.

No. 2 was the improved enclosed arc burning white flame carbons.

No. 3 the usual open type burning one pair of ordinary carbons. The current consumption was equal for each lamp, namely, 18 ampères at 200 volts. The light from each lamp was reflected from white blotting paper through a neutral grey transparency of graded steps, and exposures were made under the same conditions until the resulting negatives were as nearly as possible equal. Ordinary three-colour filters were used, and it should be remarked that some ultra-violet penetrates the blue filter, thus giving the enclosed arc an advantage for this exposure, which it would not possess if the blue filter excluded the ultra-violet as perfectly as it should do.

CHRIST CHURCH COLLEGE.

LASCELLES & Co. Photograph by M. J. RIDLEY.

The following table shows the average result of many tests :—

Lamp.	Blue Filter.	Green Filter.	Red Filter.	Total Exposure.
Enclosed arc solid carbon.....	10	30	60	100 seconds.
Enclosed arc (improved), white flame carbon	15	20	30	65 ,,
Ordinary open arc	15	15	25	55 ,,

It will be seen that the open arc is very much superior to the ordinary enclosed and somewhat superior to the improved white flame lamp. In practice there would be so much time occupied in cleaning the glasses frequently, in spite of the special construction, that it is doubtful if there would be any real economy over the ordinary solid carbon enclosed, which is less trouble to keep in order than any arc lamp in my experience.

These experiments lead to the conclusion that the best form of artificial light for colour work, at present, is the open type arc; on a 200-volt circuit the most economical lamps are those having pairs of carbons in each, provided they are not too troublesome to maintain.

I have to acknowledge the help of Mr. A. J. Bull in carrying out the experiments.

DESIGN FOR A TAILPIECE.

Design and Block by
L.C.C. SCHOOL OF PHOTO-ENGRAVING.

Wallage & Gilbett, Ltd.

Photographs by J. C. Burrow, F.R.P.S.

Cornish Mines.

Canterbury Times, N.Z.

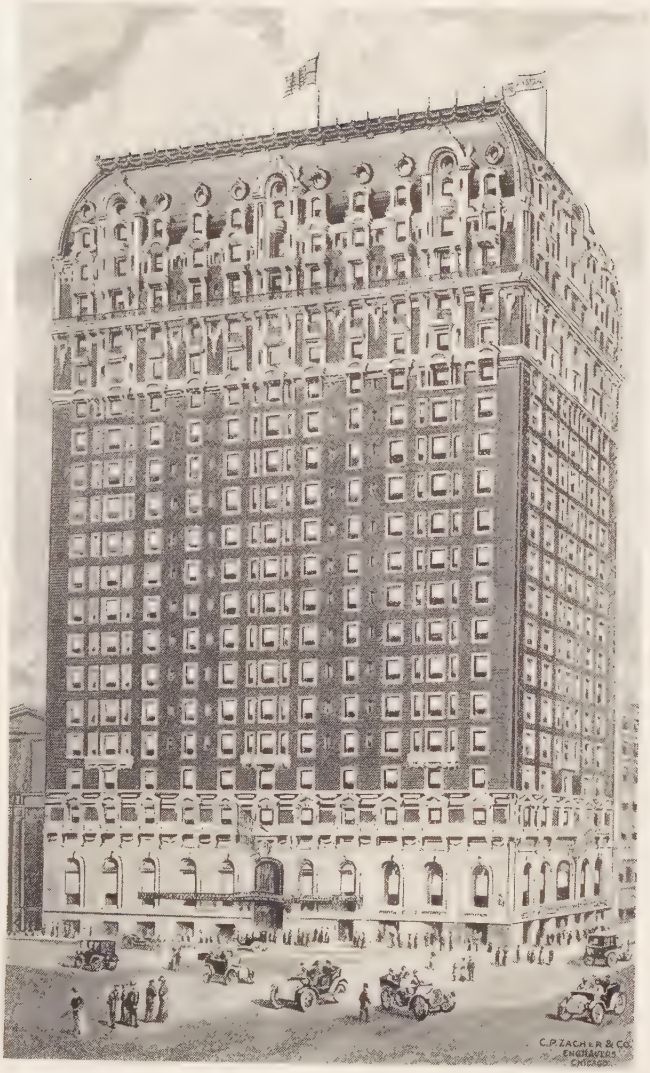
Photograph by H. H. Clifford.

Young New Zealand.

Hill & Co.

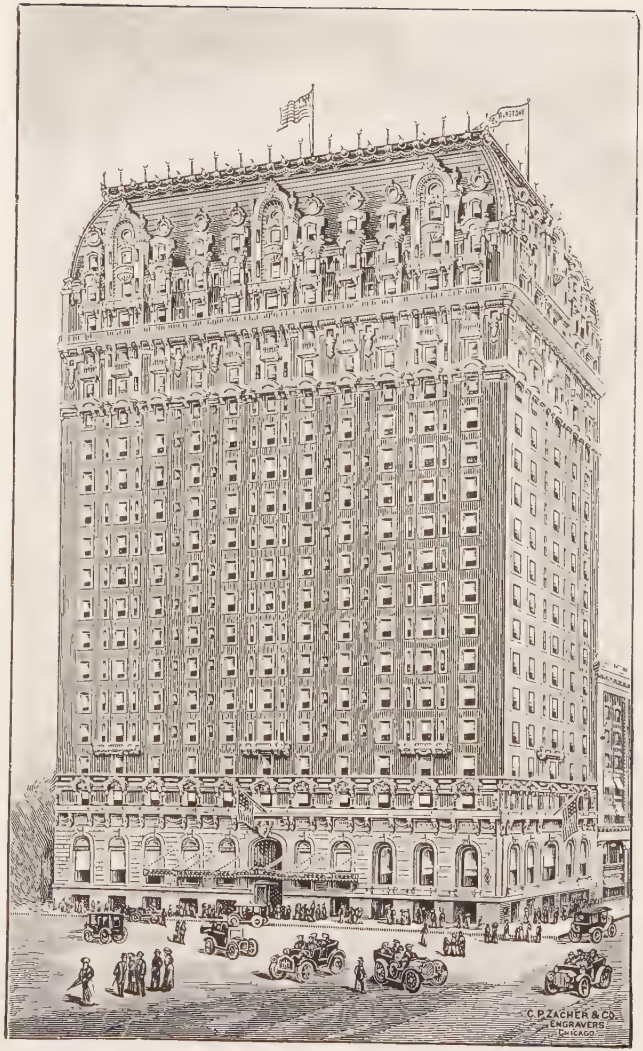
Photograph by Dover St. Studios

Miss Marie Lohr as "Marguerite."



Half-Tone Block.

C. P. Zacher & Co.



Woodcut.

"The Blackstone."

Chicago's Newest Hotel.

An interesting comparison between the two methods of illustration.

Ransom Engraving Co.

Miss Genevieve Blinn.

A two-colour reproduction, obtaining rich brown shadows and realistic flesh-tints.

Gatchell & Manning. *Photograph by The Haeseler Photographic Studios.*

Ex-President Roosevelt.

Showing special "Woodpine" treatment of background.

Watford Engraving Co.

Photograph by F. Downer & Sons.

A Stately Interior.

British Photo Engraving Co.

Photograph by J. P. Glover.

Bradford-on-Avon Bridge.

Pawson & Brailsford.

W. J. Bates.

A Simple and Expeditious Method of Making Blocks.

By S. K. LAWTON (Manipay, Jaffna, Ceylon).

THE COMET.

MARSHALL ENGRAVING CO. Photograph by S. K. LAWTON.

PROFESSOR of the Jaffna College, a Tamil gentleman of high culture, who had been making calculations of the local appearance of Halley's comet, came to me and wanted a block made of it, from a rough sketch of the different positions of the earth and the comet, to appear in the local newspaper, in a very short time. As the diagram was to be white on a black ground, it was necessary to make a finished drawing, reproduce a negative and to print and etch it in the ordinary way on bichromated albumen. All this would have taken much time, as I did not possess the appliances that constant and extensive demand enable photo-engravers in the West to supply themselves with. After some hesitation and thought I accepted the order and finished the block quickly, and to the perfect satisfaction of the professor. One side of a piece of thin writing paper was first rubbed over with chalk, and this was blackened with a BB pencil. The sketch was made transparent by oiling and wiped quite clear of superfluous oil. The blackened side of the paper was laid in contact with the grained surface of a piece of zinc, and over this was placed the sketch the reverse side up, as seen through the transparent paper. The lines were run over with a sharply-pointed HHH pencil, and on removing the papers there appeared on the zinc plate an exact tracing of the sketch in reverse. With a fine pen the tracing was drawn over with a thick solution of ordinary Indian ink in water to which a little gum was added. A small quantity of retransfer ink was dissolved in turpentine and flowed over the plate and dried. With a soft roller the plate was liberally coated with retransfer ink and placed in water. The Indian ink, with which the drawing was made, softened and dissolved away readily, leaving the lines clear white on a dense black ground. The flowing over with the retransfer ink might seem superfluous, but simple rolling will not cover the lines close up to the edges owing to the slight relief of the Indian ink drawing. The Russell powder process was the one used by me, and two etchings in strong acid baths were sufficient. The process will be useful in newspaper offices where diagrams and maps can be made expeditiously with a few simple materials by any one possessing skill in drawing. When black lines are to be introduced they can be drawn in with the retransfer ink dissolved in turpentine.

Irradiation.

By C. E. KENNETH MEES, D.Sc.

WHEN a spot of light falls on a plate its effect is not confined strictly to the portion of the plate on which the light falls, but the effect spreads to a small extent *sideways* in the film. This side spread is called irradiation.

The simplest explanation of the phenomenon is given in Fig. 1. It will there be seen that the direct ray, falling on the plate, not merely affects the silver bromide grain directly in its path, but is reflected amongst the grains and affects a number of the surrounding ones. Now, if a grain becomes developable at all, in any part, that grain will be completely developable, and, with sufficient development, all the silver bromide of the grain will be reduced to silver. So that, if no reflection occurs in the film, the smallest diameter of a point of light would be one complete grain, but since reflection does occur that diameter will be several grains. This simple explanation has been generally accepted, and there has been drawn from it a corollary, namely, that the irradiation of a plate will be directly dependent upon the size of the grains, and that plates with smaller grains will show less irradiation than plates with larger grains.

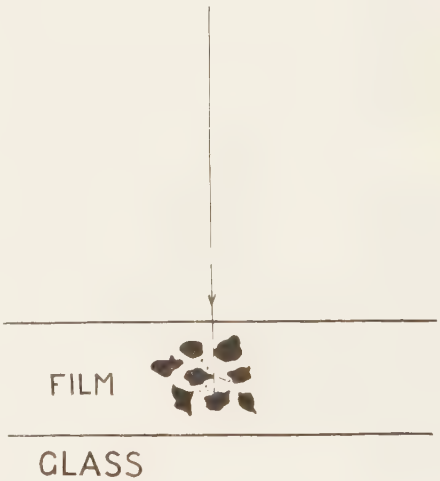


Fig. 1.

For some time I had suspected that the relation between the grain of a plate and the irradiation was not quite so simple as is above indicated, and I had made several attempts to measure the irradiation of plates, but those attempts failed because of experimental difficulties, although the matter is not difficult when a method has once been found. The difficulties arise from the extreme smallness of the effects. Dry plates are quite satisfactory when used to make screen negatives with a 200-line screen, so that clearly the side spread of the dots must be less than 1/400th inch. As a matter of fact, the distance to which the irradiation spreads is of about this order, and if measurements are to be made we must be able to rely on our apparatus to about 1/25,000th inch.

Now if a tri-colour process operator has difficulties with register, for which 1/100th inch is perfectly satisfactory, he will be able to realize that the arrangement of an instrument which shall be sufficiently rigid and sufficiently free from vibration to maintain its position to 1/250th of 1/100th inch may present difficulties.

The difficulties were, however, overcome by the use of a heavy camera, built of brass tube and arranged to photograph an object at the other end of a box 10 feet long, by means of a lens of 6 inches focus. The whole apparatus was slung

from the roof to stop vibration. The object used was a spectroscope slit with a wedge of black glass over it allowing sixty times as much light to pass at the top of the slit as at the bottom. The image of this slit on the plate is about 1/50th inch high, and 1/1000th inch across at the bottom, but it spreads out at the top as is shown in Fig. 2, which is a photo-micrograph of one of the plates.

From their shape I called these images "tadpoles."

The tadpole is characteristic of the plate; a plate showing much irradiation will produce a tadpole with a wide head; one showing little, a tadpole with a small head, and so on. As soon as a few tadpoles were obtained it became clear that my suspicion, that irradiation was not so simply connected with grain as the simple explanation would lead one to believe, was well founded.

Fig. 2.

Fig. 3.

Fig. 2, for instance, is a photo-micrograph of a tadpole on a process plate, and Fig. 3 of one on a lantern plate, although the lantern plate is of *much* finer grain than the process plate.

This seems to show that the explanation given at the beginning of this article is not sufficient and that some other influence besides simple reflection among the grains is at work.

A possibility is that with grains which are nearly of the same size as the wave-length of light, as the lantern plate grains are, the light is not only reflected but is also diffracted by the grains. This was examined. Diffraction scatter, being dependent on the wave-length of the light used, should give different results with differently coloured light; reflection scatter will not show any such differences. The results which I obtained, however, were not conclusive, and the subject is still a matter of doubt.

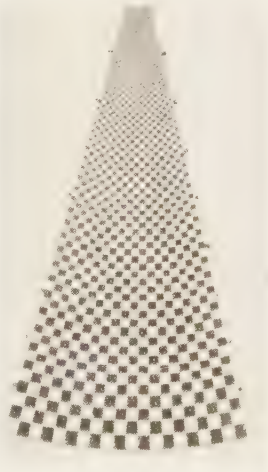


Fig. 4.

With plates of all ordinary kinds little decrease of irradiation with blue light can be obtained by reducing the size of the grain; in order that much advantage may be obtained the grain must be greatly below the wave-length of light, and plates of such a small grain are too slow to be of practical use. Plates, however, in which the image is entirely on the surface, as in wet collodion, have considerably less

irradiation than emulsion plates, where the image is distributed through the film, and in these plates any diminution of the grain at once diminishes the irradiation, as diffraction scatter mainly affects the body of the film and the surface to only a very small extent. It is for this reason that the "Albumen" process, developed like a wet plate, can give pictures with such complete absence of irradiation; even the "grainless" Lippmann plates cannot produce such results by an emulsion process.

The effect of irradiation is most easily expressed as the "resolving power" of a plate. The resolving power is the distance which must separate two lines of light falling on a plate if they are to be shown as two separate lines and not as a general blur. It is expressed as the "period" of a line screen which is just resolved by the plate. In practice I originally found the resolving power by substituting line gratings for the spectroscope slit and photographing them, changing them until I found the grating which the plate would just "resolve," that is, show as having structure. In this way I found, for instance, that for a process plate if the image of the grating had 700 lines to an inch it would resolve it and show it as a grating, but if it had 750 lines it would not, but only give a blur.

Fig 5.

This method is slow, and not very accurate, so that it has been abandoned in favour of a converging grating shown (full size) in Fig. 4. In this grating the squares are always equal to the spaces and it is equivalent to a complete range of gratings varying from one to ten in lineage. When reduced on to the plate the range of gratings is from 250 to 2,500 squares to the linear inch.

This grating is photographed in the irradiation apparatus, and the resultant negative, Fig. 5, examined by means of a microscope having a micrometer screw movement on its stage, and a narrow slit in the eyepiece, so that only a small section is seen at a time. The plate is made to travel under the microscope until resolution is seen in the eyepiece slit and from the known data the period the grating when the plate is just resolving is calculated.

By this method the whole question of irradiation and resolving power can be investigated with an ease of which the earlier methods were not capable.

It would take too long to describe all the results obtained, the dependence of resolving power on exposure and development, and the exact relation between irradiation and the grain of the plate, but I hope that this brief account of the principles involved and the methods of investigation adopted will not be without interest.

C. Dresdin & Co.

A Glimpse of the Lake.

Printed by the "Relievogravure" Process.

Decorative Book-Covers.

By GEO. A. STEPHEN.
Author of "Commercial Bookbinding."

F making many books there is no end," said the Preacher, and this fact has been reiterated with increasing force all down the ages. The great spread of education in the 19th century naturally created in the masses a keen desire for literature, and this desire was satiated by the production of cheap books, thanks to the ingenious machines which were invented during that century for the rapid printing and binding of books.

"Not as ours the books of old,
Things that steam can stamp and fold."

The nineteenth century also witnessed the introduction (about 1822) of cloth as a covering material for books—an innovation due to the enterprise of Archibald Leighton. At first the cloth covers merely served a utilitarian purpose, and they were left plain, a paper label bearing the title being pasted on the back; but in course of time, as with other articles of utility, it was realized that book-covers could be rendered ornamental, and thenceforth attention was paid to their decoration.

Until about thirty years ago the publishers' book-covers were mostly of the "penny plain and tuppence coloured" varieties. Walter Crane, in his recent work entitled *An Artist's Reminiscences*, tells us that some of his earliest work was the designing of the "covers of cheap railway novels, which we sometimes called, from their yellow hue and sensational character, 'mustard plasters.'" As a rule, however, the publisher depended upon the binder for the designs for book-covers, and the bookbinder generally had to rely upon the die-cutter; consequently most of the earlier designs had little or no artistic merit, and many of them were incongruous. Since that time progress in the art of making decorative book-covers has been rapid, each succeeding year witnessing a steady improvement in taste and style.

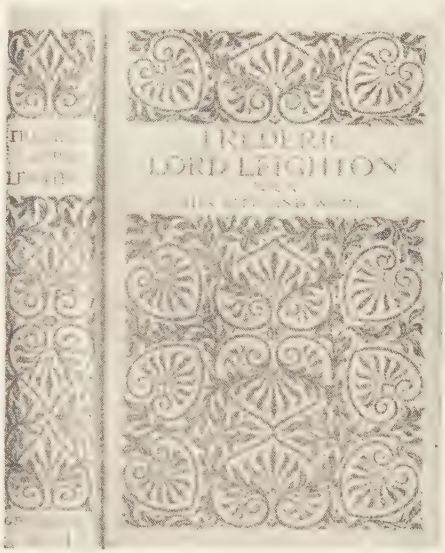
At the present day the exigencies of trade have caused publishers to tax their ingenuity to the utmost, and they vie with each other in presenting their wares in as attractive a form as possible. They are apparently convinced that a book, like a woman, is none the worse, but rather the better, for having a good dressmaker. To this end they have enlisted the services of artists of distinction to design book-covers and end-papers, and now it is quite a commonplace remark that, so far as certain classes of literature are concerned, "the cover sells the book."

Cloth book-covers may be decorated by embossing, blind stamping, blocking in gold or alloyed metals, and printing in colour, or by a combination of some of these processes. The mechanical processes for reproducing the designs have been almost perfected, gold blocking has now reached a high standard of excellence, and colour-printing upon book-covers is practised frequently with artistic effect. A very large range of cloths is now obtainable, including art canvas, buckrams, linens, etc., in almost innumerable hues and diverse patterns. If the cover is to be decorated simply by blocking in blind or gold, or by printing in one colour,

The reproductions of covers illustrating this article have been made by the Grout Engraving Co., 68, Old Bailey, E.C.

a single die is all that is necessary, but if the cover is to be decorated in gold and one or more colours, a separate die is required for the gold and each colour, unless the colours are to be blended in such a way that the colours are applied in bands up and down or across the cover. The maximum number of colours used for book-covers is usually four, and more frequently only one or two are used, with or without the addition of gold. There are several reasons why the number of different colours should be restricted as much as possible, the two most important of which may be mentioned. In the first place, cloth does not take colour as well as paper does, and frequently, to obtain an even colour on the cloth two printings are necessary, especially if the cloth is of a dark shade ; moreover, if several colours are used a very " painty " appearance is generally the result. Very good effects can be obtained by printing the design on a light coloured cloth with ink of a darker shade, while the title may be printed in gold. In the second place, as each colour generally requires a separate printing, or even two

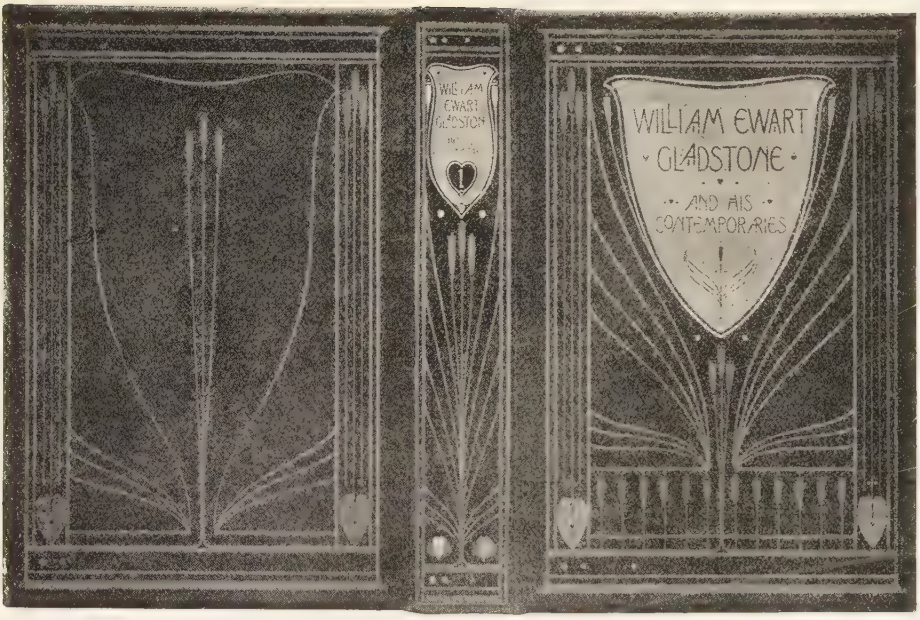
Design by A. A. Turbayne, in gold on dark brown cloth.
Courtesy of T. C. & E. C. Jack.



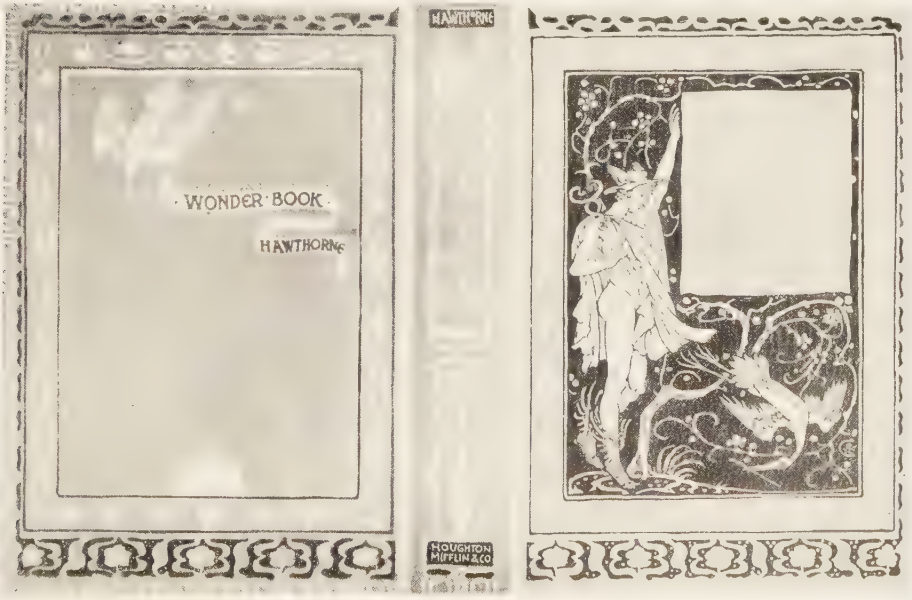
Design by Christopher Dean, executed in gold and yellow ochre on Naples yellow cloth.
Courtesy of G. Bell & Sons.

printings, the successive printings become an important factor in the cost of production. Gold leaf, of course, is the best medium for the decoration of book-covers, but its high price necessitates its restriction to the decoration of covers of the more costly books, and its use on the covers of the cheaper books is generally limited to the title. In decorating a book-cover primary consideration should be given to the title, which should always be easily discernible ; usually this can be best effected by the use of gold, which also has the merit of enriching and heightening the effect of the colours.

Fine printing in white on coloured cloths was almost an impossibility until the comparatively recent manufacture of white foil for the purpose. Book-covers decorated entirely in white foil look very effective, but unfortunately the writer's observations of such books which have circulated in public libraries prove that



Design by TALWIN MORRIS, executed in gold and two shades of light green on dark green cloth.
Courtesy of The Gresham Publishing Company.



Symbolic design by WALTER CRANE, in brown and pale green on cream cloth.
Courtesy of Houghton Mifflin Co., U.S.A.

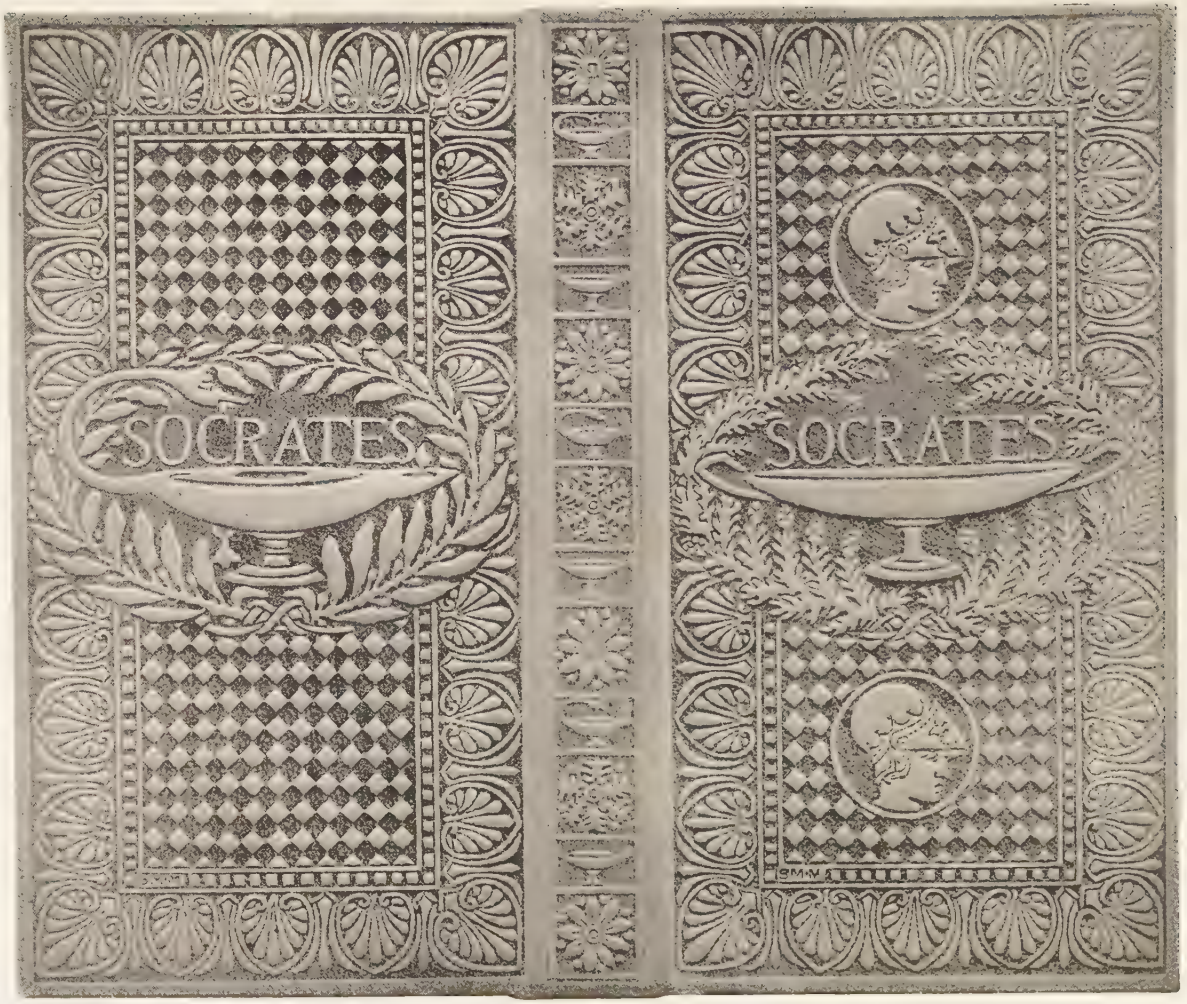
the foil quickly rubs off, and the covers soon present a very shabby appearance. More attention might with advantage be given to the decoration in " blind " (*i.e.*, the impressing of the die directly on the book-cover without the use of any foil or ink) of book-covers, whether they be of leather or cloth. If cloth covers are to be blocked in blind it is necessary that the cloth should have a rough or grained surface; otherwise the blocking would not be apparent. Excellent results can be obtained by this method, as may be seen by the illustration given of the beautiful cover of *Socrates* in the Thumb-nail Series, hereinafter mentioned.

Paper covers have frequently been decorated by lithography, but it seems to have been left to the enterprise of Messrs. A. Constable & Co. to apply this process to cloth covers. On the upper cover of the edition of Oliver Goldsmith's ever-popular, didactic poem, *The Deserted Village*, published by this well-known firm last autumn, is an excellent reproduction of a charming rustic scene painted by W. Lee Hankey, obtained by lithographic printing on a specially prepared cloth. It is to be regretted that a coloured illustration cannot be given here.

That there is almost an infinite variety of book-cover designs may be indicated by the mere mention of the names of the following artists (selected at random), all of whom have devoted their talents to the decoration of book-covers :—Walter Crane, Arthur Rackham, A. A. Turbayne, Edmund Dulac, Sir Hubert von Herkomer, Byam Shaw, Charles Ricketts, Gleeson White, John Hassall, R. Anning Bell, Laurence Housman, H. Granville Fell, Talwin Morris, Lewis F. Day, Stanford White, Miss M. V. Wheelhouse, Miss Alice B. Woodward, Gordon Browne, F. D. Bedford, L. Leslie Brooke, J. A. Schweinfurth, Althea Giles, Louis Davis, Mrs. Blanche McManus Mansfield, Miss Margaret Armstrong, Mrs. Sarah M. Whitman, Reginald Knowles, William Nicholson, Aubrey Beardsley, Christopher Dean, W. Heath Robinson, Garth Jones, and Chas. E. Dawson, illustrations of whose work may be seen in his article on " Modern Book Covers," published in Penrose's *Pictorial Annual* for 1908-9, pp. 177-184. The styles of book-cover decoration may be broadly grouped into four classes : (1) Purely decorative designs; (2) Symbolic designs; (3) Heraldic designs; (4) Pictorial designs. The aim of the artist in producing a decorative design is simply to cover the available space in a dignified and beautiful manner; in producing a symbolic design the object is to suggest by imagery the purport of the book; in a heraldic design the art of armory is applied to the subject of the book; while the pictorial designs are obviously intended clearly to illustrate the contents of the book.

A beautiful specimen of book-covers belonging to the class of pure decoration is the cover of Messrs. T. C. and E. C. Jack's edition of that admirable English classic for youthful readers, Lamb's *Tales from Shakespeare* (of which an illustration is given), which is executed in gold on dark brown cloth. This dignified and graceful design, influenced by early Greek ornament, is a characteristic example of the work of A. A. Turbayne, the demonstrator of design at the L.C.C. School of Photo-engraving and Lithography, who stands in the front rank of designers who are producing designs chiefly of purely decorative character. This designer has been prolific in the production of successful book-covers, many of which are for the extensive series of colour books published by Messrs. A. and C. Black.

Taking the Greek anthemion ornament as his *motif*, Christopher Dean has produced a dignified design for the cover of Ernest Rhys' work on *Frederick, Lord Leighton* (George Bell & Sons), illustrated herein; this design is very appropriate, as the best works of this famous British artist are Greek classical studies. This cover is a good example of the pleasing effect that can be obtained

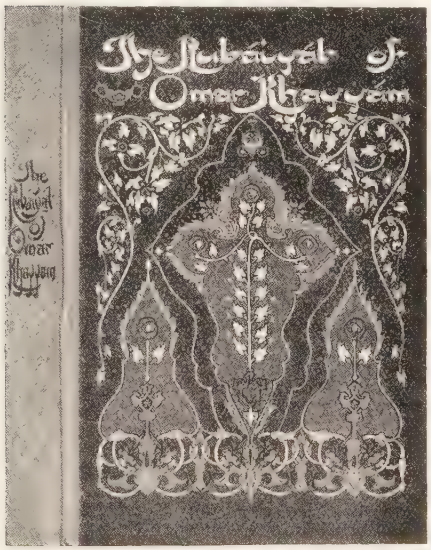


Design by Mrs. Blanche McManus Mansfield, executed in brown leather, the design being embossed in blind.
Courtesy of The Century Company, U.S.A.

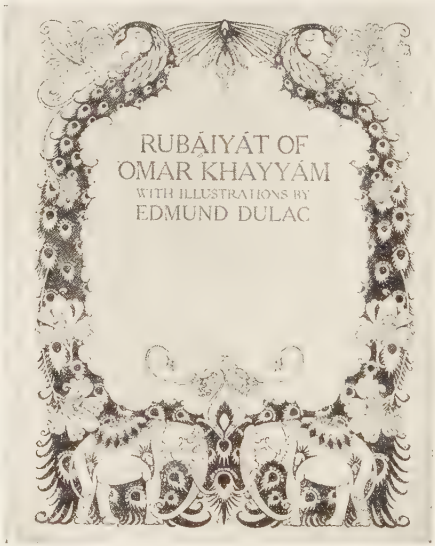
by blocking in gold and the use of one colour; the title is in gold and the design is printed in yellow ochre on Naples yellow cloth.

Talwin Morris has produced a number of decorative designs which are very distinctive, and reveal marked individuality. Lines and curves enter largely into many of his designs, and frequently their *motif* is the "compressed heart," as it has been called. The example selected for illustration is Archer's *Gladstone and his Contemporaries* (The Gresham Publishing Company), executed in gold and two shades of light green on dark green cloth; the obverse and reverse covers each has a design complete in itself, and the design on the back forms a summary of the two, the three divisions making, as they should do, a homogeneous whole.

Although the distinction has been made between purely decorative and symbolic ornament, the distinction cannot always be clearly defined; indeed, an undercurrent of symbolism can be traced in most ornament, whether it be ancient, mediæval or modern. It cannot be gainsaid that abstract ornament,



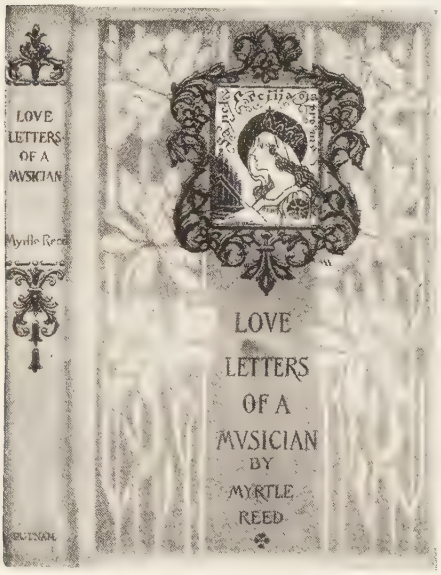
Design by Willy Pogany, which suggests the colour and glow of the Orient.
Courtesy of G. G. Harrap & Co.



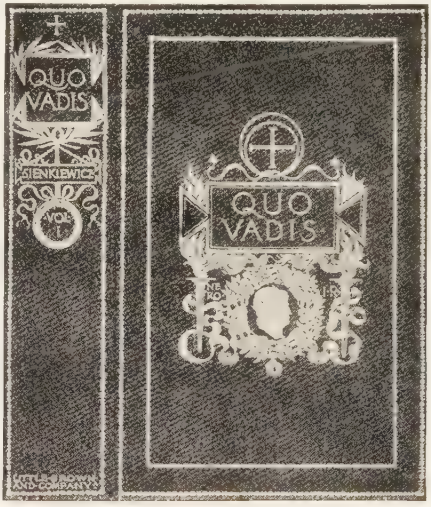
Design by Edmund Dulac, executed in gold on white canvas.
Courtesy of Hodder & Stoughton.

to a large extent, is beyond the sympathy and the understanding of "the man in the street." The function of ornament is to add interest to construction; and therefore to lend additional interest to his book-cover and to express the purport of a book, the designer very frequently has recourse to symbolism. Symbolic designs or emblematic devices are to be found in abundance on book-covers, particularly those of works of history and travel, of books dealing with the art of particular countries, and of religious works. For example, on historical and topographical works the chrysanthemum is used as the emblem for Japan, the dragon and the turtle for China, the peacock for Siam, and the lotus plant, the sacred beetle (*scarabæus*), or the winged globe for Egypt. Books concerned with the art of a particular country commonly have cover-designs typical of the

national style of ornament of that country. On the book-covers of religious works the emblems of Christ naturally occur with frequency ; a favourite emblem on such works is a monogram formed of the first two letters (Chi and Rho) of the Greek word for Christ (ΧΡΙΣΤΟΣ), and this monogram is frequently completed by the addition of the Greek letters Α and Ω, signifying that Christ is the commencement and the end of all things. A. A. Turbayne has done a nice symbolic cover-design for Farrar's *Life of Christ as represented in Art* (A. & C. Black), the back of which is decorated with this monogram, while the obverse cover is decorated with a conventional treatment of the vine, a common symbol of Christ : " I am the Vine : ye are the branches." The cover of Stephen Crane's *Pictures of War* (Wm. Heinemann), designed by Wm. Nicholson, simply consists—apart from the lettering—of a sword, in red, on either cover. Occasionally punning devices are introduced in the cover designs ; for example, the design of the cover of Penrose's *Pictorial Annual* includes a *pen* and *roses* which are, of course, in direct allusion to the name of the firm producing the work.



Design by Miss Margaret Armstrong, in which the decoration is embossed.
Courtesy of G. P. Putnam's Sons.

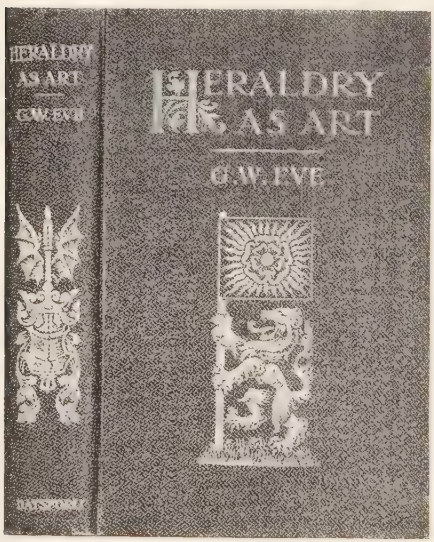


An appropriate design by J. A. Schweinfurth, in gold on purple cloth.
Courtesy of Little, Brown & Co., U.S.A.

Some characteristic book-covers with symbolic designs, of which illustrations are given, may now be described. Walter Crane, who, it need scarcely be said, stands *facile princeps* amongst living designers, has been especially successful in his designs for children's books. His felicities of design are seen to advantage on the cover of Nathaniel Hawthorne's *Wonder Book for Boys and Girls* (Houghton Mifflin Co., Cambridge and Boston, U.S.A.). The cover teems with symbolic ornament suggested by the names of the author and the designer and by the old Greek myths which are charmingly retold by Hawthorne : the whole design is essentially Greek in character ; the borders of both covers are based on Greek ornament ; on the front cover is the figure of Mercury (whose tale is told in the chapter entitled

"The Miraculous Pitcher") carrying his caduceus, with wings on his feet, and wearing a flat broad-brimmed hat ornamented with wings; on the back is a Greek vase. It will be observed that the bird which typifies the name of the designer, and the plant which suggests the author's name, figure prominently in this design. The cover is printed in brown and pale green on cream cloth.

Mrs. Blanche McManus Mansfield's designs for some of the volumes of the Thumb-nail Series published by the Century Company, of New York, U.S.A., are very effective and suggestive. The illustration (same size as the original) of her book-cover for *Socrates* in this series is particularly worthy of attention; the cover is of brown leather and the design is blocked in blind. On the front cover, between two medallion portraits of Athena, is depicted a Greek cup (known as a kylix) surrounded by sprays of the deadly hemlock, indicating the manner of the death of the great Athenian philosopher; on the reverse side is a Greek lamp surrounded by laurel leaves, the symbols of wisdom and honour. The Greek anthemion ornament forms the border of both covers, and the chequer (or chess-board) pattern is representative of the pavement of the Stoa where Socrates walked and talked.



An heraldic design by G. W. Eve, in gold on blue cloth.
Courtesy of B. T. Batsford.

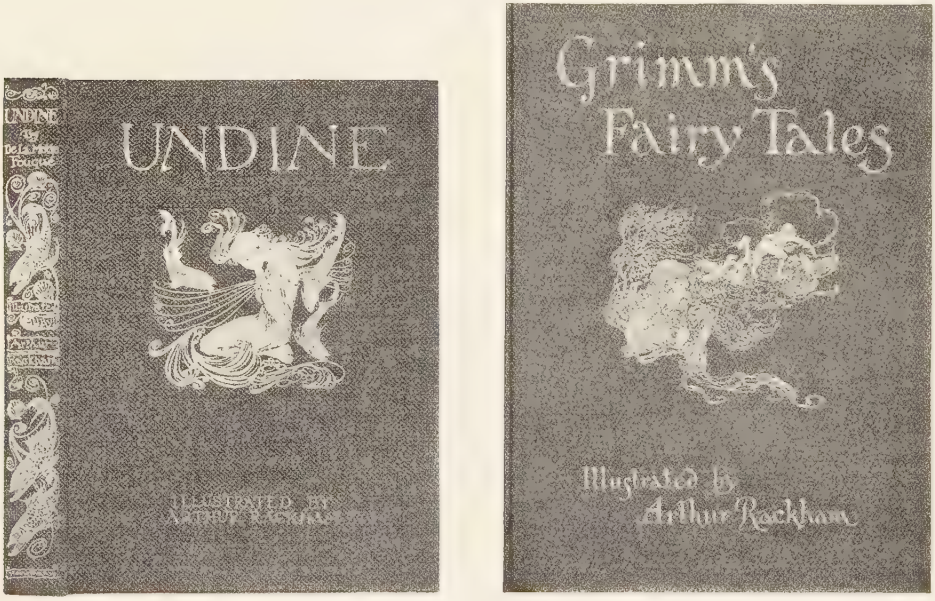
In the many editions of the *Rubáiyát* of Omar Khayyám numerous artists have sought to interpret in line and colour the spirit of this poem of the Persian astronomer-poet of the eleventh century. One of the most charming and successful editions is that illustrated by the clever Hungarian artist, Willy Pogany, which was published in October, 1909, by Messrs. G. G. Harrap & Co. His cover design, herein reproduced, is a strikingly original treatment of roses and the leaves of the vine, suggested, of course, by the wine-cup and roses which pervade Fitzgerald's quatrains. In the preparation of this work Willy Pogany had the advice of a competent Orientalist so that he might more adequately convey in his work the colour and glow of the Orient. It will be observed that the character of the letters of the title suggests that of the Arabic. The cover is printed in four colours on Japon vellum, and has a canvas back blocked in gold, with the title and the *motif* of the cover design.

By way of contrast an illustration is given of the cover of Messrs. Hodder and Stoughton's charming edition of the *Rubáiyát*, published in 1909; this beautiful design is by the young Franco-British artist Edmund Dulac, who has deservedly won fame as an illustrator by his excellent work which reveals variety of imagination and considerable skill. Naturally the *motif* of the designs for editions of the *Rubáiyát* is frequently the vine and the rose, but Edmund Dulac has forsaken these in favour of the elephant and the peacock; the conventional treatment of the peacock with its gorgeous plumage is very effective. This design is executed in gold on white canvas.

Three-Color Block
he Zeese-Wilk
New York

Miss Margaret Armstrong is another American lady artist who has produced many notable designs for various publishers. An illustration is given of her design for Myrtle Reed's *Love Letters of a Musician* (G. P. Putnam's Sons, London and New York), executed in gold on cloth of an ultramarine ash colour, with embossed floral design. Within a gold frame on the upper part of the front cover is a representation of the head of the patroness of music, and a row of organ pipes, maintaining the tradition that this saint was the inventor of the organ ; above these is the motto " Sancta Cecilia ora pro me."

The cover of the American edition of *Quo Vadis* (Little, Brown & Co., Boston, U.S.A.), has an admirable and appropriate design by J. A. Schweinfurth, blocked in gold on purple cloth—a significant colour for the subject of the book. The head of Nero within a wreath, flaming torches, and a cross, which are conspicuous



Two characteristic designs by ARTHUR RACKHAM, executed in gold on blue and red cloth respectively.
Courtesy of Mr. Wm. Heinemann. *Courtesy of A. Constable & Co.*

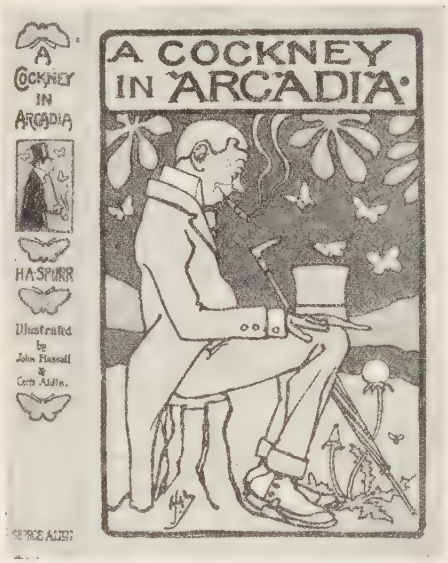
in the design, are appropriate to this fictitious narrative dealing with the atrocities of the tyrannical and debauched Emperor Nero, and the life of the early Christians.

Heraldry naturally plays an important and useful part in the ornamentation of certain classes of books, particularly historical and biographical works. For historical works the national arms of the country whose history is related are frequently employed on the covers, either alone or in combination with other ornament, and for biographical works family arms are similarly treated, sometimes with the addition of the biographee's signature in gold. As a matter of course, heraldic devices are also to be found on works devoted to the subject of heraldry. The cover of G. W. Eve's *Heraldry as Art* (B. T. Batsford), of which an illustration is given, has a very bold and striking design—a lion rampant supporting a banner on which is a rose—by the author, executed in gold on blue cloth.

There is an abundance of pictorial book-covers, especially on children's books. Children of all ages are passionately fond of pictures, and the predominance of pictorial book-covers may be partly accounted for by reason of the fact that they are perfectly intelligible to the vast number of persons who unfortunately do not possess a knowledge of design and ornament, and who therefore fail to appreciate greatly those covers that have purely decorative or symbolic designs. It may be stated as an axiom that the more simple and more explicit the design, the greater will be its appeal to the masses. These pictorial designs are frequently explanatory of the titles of the books they adorn; they generally depict a striking scene, or one or more prominent characters in the book, and they approximate to the poster.

The Decorative Designers of New York, whose work generally bears a cipher composed of two D's interlaced, have executed some very fine designs of varied

Pictorial design by THE DECORATIVE DESIGNERS OF NEW YORK, in gold, white and gray on dark mauve cloth.
Courtesy of Harper & Brothers.



Humorous design by JOHN HASSALL, in black and three colours on light buff cloth.
Courtesy of George Allen & Sons.

character. A pleasing example of their pictorial covers is that of *The Chariot Race from Ben Hur* (Harper & Brothers, New York and London), taken from General Lew Wallace's popular story of the times of Christ, entitled *Ben Hur*; this design, blocked in gold, white and gray on dark mauve cloth, is very suggestive of the thrilling chariot-race at Antioch, which is vividly described in the book.

The creative and versatile artist Arthur Rackham, who has attained well-merited fame as a book illustrator, has designed some excellent book-covers. One of the examples selected for illustration is that of Mr. Wm. Heinemann's recent choice edition of De la Motte Fouqué's famous and romantic tale *Undine*,

which contains illustrations executed with Rackham's customary vigour and originality. The design, blocked in gold on blue cloth, is an excellent portrayal of the water-spirit in her grief, whose name gives the book its title. An equally charming and characteristic design is that for the cover of Messrs. A. Constable and Co.'s sumptuous edition of Grimm's fascinating *Fairy Tales*, translated by Mrs. Edgar Lucas. Here, again, the design is pictorial, being an illustration of the tale of the goose-girl, who is depicted combing her waving locks of hair while the breezes are blowing and Curdken is running after his hat. The lettering in each of these examples, it should be noted, is not blocked in solid gold, but is made up of strong, exquisite lines, in keeping with the general character of the design. Other examples of Arthur Rackham's recent work may be seen on the covers of Dean Swift's *Gulliver's Travels* (Dent & Sons), Barham's *Ingoldsby Legends* (Wm. Heinemann), and Shakespeare's *Midsummer Night's Dream* (Wm. Heinemann).

John Hassall, whose name is a household word and who is recognised as the king of poster artists, has also produced a number of pictorial and humorous book-covers, good examples of which may be seen on G. A. Henty's works, published by Messrs. Blackie & Son, W. Sapte's *By the way Ballads* (Sands & Co.), *The Punch Library of Humour*, etc. The selected illustration is from his ludicrous cover of Harry A. Spurr's *A Cockney in Arcadia* (George Allen & Sons), carried out in black and three colours on light buff cloth; it is a typical product of his unfailing sense of humour. Such a cover as this cannot fail to arrest the eye and make an irresistible appeal to the onlooker. Who would not desire to know more of the pilgrimage of the cockney into Arcadia after he or she had cast eyes on the cover of this book?

The book-covers herein illustrated are typical of the best work that is now being produced, and it is hoped that they may prove of interest to the general reader, while they may perhaps be suggestive to those who are engaged in this fascinating branch of designing.

A bookseller's window now-a-days is as attractive as the ribbon window of a drapery establishment, and as many-coloured as a flower show. Although some of the book-covers must be described as mediocre, and others as gay and gaudy, and likely to fascinate a young mademoiselle whose soul is locked up in her paint-box, yet numbers of them are of much artistic worth, and it is only to be regretted that they will not bear frequent handling before losing their pristine beauty.

A Cameo

Half-Tone Engraving Co., Ltd.

Photograph by
E. W. Jackson.

Suggestion for a New Photographic Colour Screen Plate.

By F. DOGILBERT.

BOLTON ABBEY.

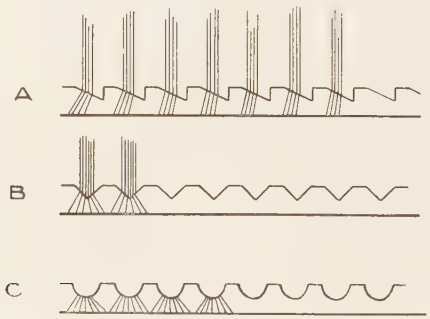
ARC ENGRAVING CO. Photograph by M. R. BRODIE.

THE following are methods I would suggest for forming the screen for screen plate colour photography :—Sheets of celluloid could by means of moulding by pressure or other means have imparted to them on one side a multitude of prismatic surfaces, and on the other side a coating of panchromatic emulsion may be applied. Then on exposing such a plate through the prismatically moulded side the colour is recorded by diffraction and dispersion at the same time, without any special arrangements. After development and reversal of the image a plate should be obtained, reproducing the subject with the most beautiful colours in their exact tints, such as no artificial screen could possibly accomplish.

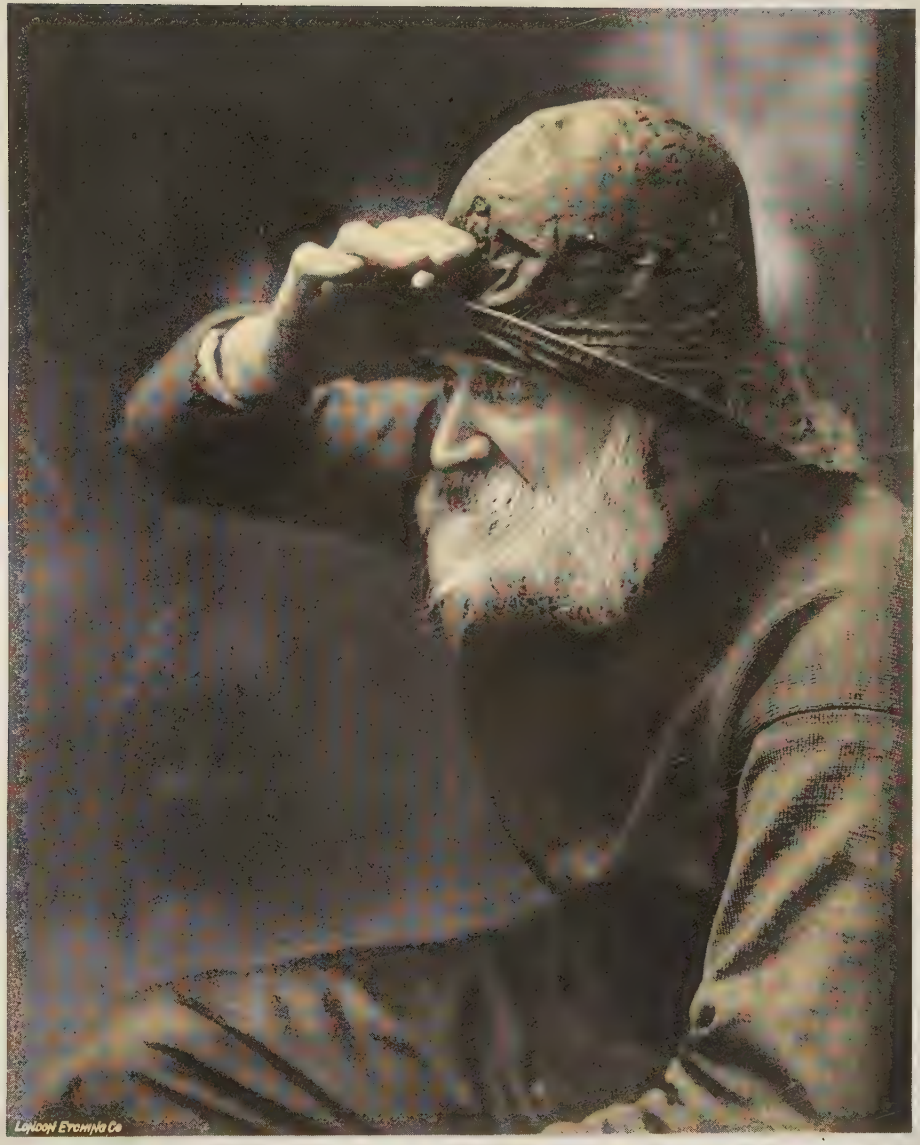
The method of manufacture being extremely simple this method would be utilized for the production of films for hand cameras and for cinematographs.

The cold moulding of films which have already been coated with emulsion would be equally possible.

The subjoined diagram will illustrate my method. The cutting of the matrices in the forms A and B could be done by a very fine tool on a dividing



machine, whilst the form C could be obtained from a half-tone plate. In A the prisms may be blackened at their apex or not, as may be found desirable. In B the surface is formed into bi-prisms. In C the formation is lenticular and non-achromatic. The emulsion is in each case spread on the smooth side.

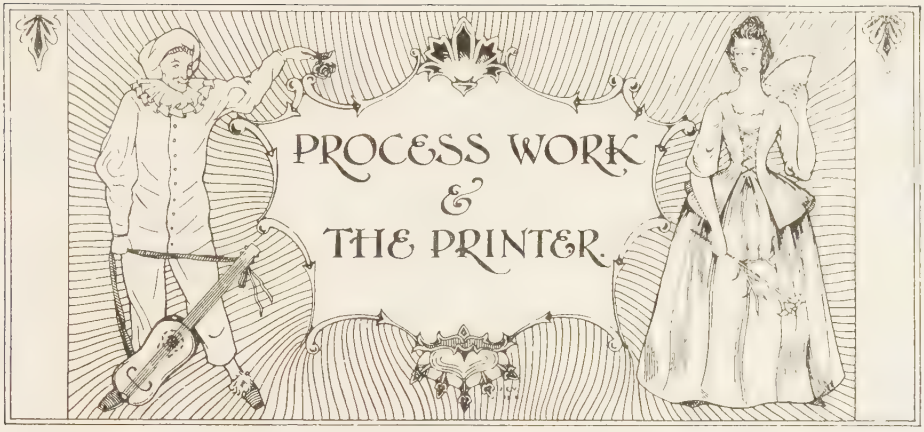


London Etching Co. *Photograph by Dover Street Studios*

On the Look-Out.

A. E. Dent & Co., Ltd. *From a Drawing by J. T. Cattle*

The Traveller.



By CHAS. T. JACOBI.

IT occurs to me that a good deal may be said on this subject that might be helpful to all concerned if the connection between illustration and printing is thoroughly studied from both an artistic and utilitarian standpoint. Given this study I am sure that it will be for the improvement of work generally. If we analyse most illustrated volumes we find that they have been designed in a somewhat haphazard manner without any consideration whatever for the connection or relation of blocks to type, or *vice versa*. In the first place, the essential thing to consider is whether the volume is to be a mere picture book or if it is to be that of a decorative character; or it may be a combination of the two, that is, it may be that the context is to be pictorial but treated in a decorative manner. But as a general rule it can be taken that illustrated books fall under two of these headings—(a) graphic, or (b) decorative.

By graphic I mean those books that are pictorially printed to delineate the subject of the work, and these are usually designed specially; that is, a volume is handed to the artist with an instruction to picture the most important points of the book, or it may be that the volume is to be illustrated by various reproductions obtained from different sources. On the other hand, those books to be decorated require a very special treatment and will test the uttermost resources of the artist, particularly if this decoration is to be made consistent with the type employed and at the same time designed with a regard to the literary side of the work.

We must not, however, overlook the fact that a perfectly plain piece of printing quite devoid of any kind of illustration, or even decoration, may be made an artistic production. To arrive at this we must select an appropriate type and decide the proportion of the page of printed matter to the leaf of paper to a great nicety. Having done this the precise position of that page on the paper is an important feature if the book is to be a success. The press work is also another essential element to be studied, for much depends on this part, and especially if the work should be an illustrated one.

In the early days of process work many difficulties were experienced in printing satisfactorily from blocks, and a comparison of work done in former times with that done now-a-days will show the great advance made in that direction from both line and, particularly, half-tone reproductions. The blame was not, however, altogether due to the printer, for in those early days the blocks produced lacked much of the depth, sharpness and finish of those made at the present time.

To do this the printer had to alter his methods entirely, and to rely on the machine manufacturer for such a press as would give him the right kind of impression adapted to the requirements of the altered conditions. Again, ink as the necessary medium between block and paper, had to be made suitable for such printing, one which was not too stiff and yet quick-drying in its action. Lastly, the question of paper had to be very seriously considered, and here was a great difficulty, because half-tone printing really requires either a very highly rolled or calendered paper, or one that has been coated with some mineral substance. This last paper doubtless gives the finest and most brilliant results, but the glare—usually a dead white—is objectionable, quite apart from the uncomfortable sense imparted by the mere handling or turning over of the leaves of any work printed on this so-called "art" paper. In addition to these objections, there is the haunting fear of an early decadence of such papers, for this coating is usually made of china clay, with a certain proportion of glue in its composition in order to fix it on to the body paper. These two substances in themselves are a danger to the length of life of any book printed on such papers, for atmospheric conditions affect such constituents, and dampness would attack the surface in a very short space of time unless very carefully preserved. If a suitable paper could be made without this artificial coating, or the use of excessively calendered paper could be avoided in the printing of half-tone illustrations, it would be a good thing and the inventor of such a paper to give really all-round satisfactory results would be deserving of our best thanks. This difficulty of printing anything with an excessively fine line or grain has, however, been overcome to some extent by the off-set process of printing by the lithographic method. Perhaps this system will be the way out of the difficulty, but we must "wait and see." This style of printing has already been so fully described in last year's edition of this work that I need not enter into a description of it—it is now history, practically an accomplished fact, as far as lithography is concerned.

My own experience as a book printer has taught me many things, and I see many signs that there is a growing demand for better work all round. The greatest difficulty the printer has to contend with is that of competition. If we really wish for first-class work one must not be limited or tied down with absurd restrictions as to the time or price to be paid. To do work leisurely is, for the general run of printing houses, out of all question, and we must accept the late William Morris's productions in printing only as examples for emulation. That his work has stimulated printing in a general way is to be admitted, for his influence is manifest, not only in this country and America, but also on the Continent.

With regard to the relations between the Illustrator and Printer, I think very much might be done for their mutual benefit if they were allowed to come more into touch with each other. Very often they are never in contact, and that certainly is a disadvantage. That there should be some affinity between illustration and decoration and lettering goes without saying, and this can often be adjusted by the use or employment of a certain type in harmony with the line of the artist. Occasionally the artist is able to adapt his work to that of the printer, for, after all, types are but of a conventional form and limited in number, whereas there should be no actual limit to the scope of the designer. On the other hand, the printer is sometimes called upon to use a stock ornament of some kind and this requires a sense of judgment deficient in some printers.

With regard to half-tone textual illustration there is certainly a lack of harmony between such blocks and printers' type. Still it is quite possible to modify that difference somewhat by a little forethought on the part of the person responsible for the designing or "lay out" of the volume. Here, again, the illustrations themselves must be considered, for if the general character of these blocks consists of many "high-lights" an ordinary old-style type with the lines opened out a little will serve somewhat to preserve the relation between illustrations and type. On the other hand, if the blocks comprise a large number of "solids" or medium tones, a heavier class of type, with the lines set closer together, is necessary. All these points require an amount of discrimination which may be cultivated by all.

If the volume consists of full-page illustrations and not textual cuts, it is advisable to place these all together at the end of the volume, thus dividing (a) text, from (b) illustrations. By these means it is possible to limit the use of the shiny paper to the pictured part and the body of the volume may be printed on one that has a more natural surface. Care should, however, be exercised in selecting the two kinds of paper that the colour or shade does not disagree. If, however, an absolute match is impossible, a contrast is better than a bad match.

There are also a few technical points I should like to mention in connection with the making of blocks which affect the more commercial side of printing. One great difficulty which presents itself to my mind at the moment is the question of mounting process blocks of all kinds. If we must have wood as a base in order to bring the height up to printing level, it should be an absolute condition that the material employed is a hard and thoroughly seasoned one. A variety of blocks, each of a different height, involves much labour to the printer, and if by chance the wood is soft or green no amount of labour bestowed on it will render it satisfactory from a printer's point of view. In both finish and mounting I think we can learn much from the blocks made by foreign firms, because I have often found them much easier to print from and less subject to picks or burrs.

The proper bevelling of the block in order to obtain a flange for pinning the plate to the mount is another point which requires very careful workmanship, especially with half-tone blocks. This is very necessary when they have to be "let in" to the text, or have lines of lettering placed underneath.

One thing I would impress on those drawing for reproduction, and that is to adopt a clean, sharp line for all work. This need not alter the character of the artist's work, but, if my advice on this subject is acted upon, we shall have easier blocks to produce and better ones to print. I have had some remarkable experiences in this respect, for I recollect printing on different occasions two consecutive volumes of a series by different designers, and although from an artistic standpoint there was not much to choose between their respective work, there was a great difference in the results when on the press, and, curiously enough, the blockmaker

expressed the same opinion as myself when notes were compared. In drawing for the press, some regard should be paid, not only to the class of type to be employed for the volume, but also to the paper on which the book is to be produced, the two things are most important to the beginner. The artist should really consider, if possible, how his work is to be dealt with afterwards, and then adapt his methods accordingly. By doing this the results will be more faithful, not only in the reproduction of his drawing as a block, but also as a specimen of good printing.

One other thing is the care or preservation of all process blocks, whether zinco or copper, after printing. Unless great care is taken these blocks are very liable to oxidization or corrosion, and thus spoil. After use they should be thoroughly cleaned and well dried, then a coating of some kind should be applied. For this purpose some use tallow and others vaseline, but I believe that a compound of tallow, asphalt and turpentine is a really good mixture. Even then zinco blocks are liable to oxidization.

Heading, Initial and Tailpiece
from designs by
J. E. Vinnicombe.

Easoprint Engraving House.

Submarines in Dock.

Photograph by West & Sons.

Block by "Daily Mirror."

Photograph by Illustrations Bureau

Funeral of Prince Francis of Teck.

GATHERING LEAVES TO FIND STRAWBERRIES
PICKING
PLACED HERE BY PICKERS, THEY ARE TAKEN INTO SHED TO BE PREPARED
LOADING UP FOR THE NORTH
RETURNED EMPTIES

Direct Photo Engraving Co.

Photographs by W. T. Green.

Strawberry Picking.

Dean Engraving Co.

Photograph by E. J. Canty.

April Sunshine.

B. Dellagana & Co., Ltd.

Photograph by W. S. Campbell.

Interior Stationers' Hall Court Room.

B. Dellagana & Co., Ltd.

Photograph by W. S. Campbell

Interior Stationers' Hall Court Room.

Nickelled Hard Metal Stereo from original on preceding page.

Northern Art Reproduction Co., Ltd.

Chepstow Castle.

Graphic Engraving Co.

Photograph by Gale & Polden, Ltd.

Royal Horse Artillery.

Musical Ride, Military Tournament, Olympia

A. Ellis Jones.

Design for Book Illustration.

The MIDDLEMAN IN ART

By CHARLES HARRAP.

"I hold the world but as the world,
A stage, where every man must play his part."

TIMES change, but in the abstract the present units of the community work on the same principles, especially in trading, as did our forefathers centuries ago. Then was the time when genius was much more rare, and by its own incentive came forward without embarrassment or hindrance. The change of time has multiplied the numerical strength of genius, as well as its practical and artistic value, but in the surging of the throng it is too apt to get pushed aside by stronger and more ambitious individuals. It is this chaotic state which forms the subject of reflection.

In every walk of life there are men and women constantly producing commodities which have a commercial value. And at the same time there are men of business aptitude yearning to find the very articles which the others are producing. It is in this way that genius is often wasted for want of proper means of inter-communication with those who could make the best use of it. The business man is a necessity to the world's economy, whether it be in the domain of antique china, daily necessities or fine arts. It is the business man in his corporate sense who holds annual exhibitions of paintings, furniture, engines and the like, to bring the purchaser into contact with and give him a knowledge of all that is done and made for commercial exchange. Whether such exhibitions are held in palatial edifices, in spacious halls, or in more convenient and more private office chambers, the principle is the same. The producer finds the commodity, the business man takes it in hand and finds the customer.

Having examined the nature of these underlying principles of trading, which have done so much to concentrate and build up both the producer and the consumer, it is not difficult to apply them to the printing crafts. As an example of the utility of the businessman, take a survey of the 1910 Printing Trades Exhibition. How many things—machinery and apparatus—were there, which were unknown to many printers, or possibly it would be more accurate to say were known only

by *name* to most of those in the printing trade ? Take but one instance, say, the offset rotary printing machines. For the first time these machines were brought face to face with the united forces of employers and craftsmen. Each could discern their adaptability to his own particular purpose. And what is of still greater moment the purchaser was saved from investing in what would not suit him, leaving him free to decide which would be the most suitable, without the chagrin of having tried one make before finding one better for his purpose.

The business man as personified by the exhibition was the means of saving money in this case, as he often is in many others. By the same reasoning, it would be interesting to know how many printers, publishers and block makers discovered in that self-same exhibition a business man who could save them endless time, worry and expense in a branch of the trade which is just as profitable to the live printer as the purchase of a novel machine ? Those who did, and they are not few, have learnt the value of the discovery with its increased profit.

This business man deals not in cold, dead steel, but in active, living brains. His products are the products of an artist's imagination, the designer's skill, a cartoonist's vivid perception, or the creations of a painstaking draughtsman. His forte is to sell sketches which bring orders, illustrations which sell goods, or pictures which compel the British public to purchase books. He provides the necessary *via media* between artists and public. There are publishers and printers who are continually beset with enquirers wanting new ideas. Their own studios, whose work in the main will meet most wants, are not always able to create an idea to catch the eye of the customer. The customer ever demands something new, something ultra-original, and the printer is at a loss to find the artist, though he may know the names of several Royal Academicians, and may even have heard of Phil May or F.C.G. He cannot approach these gentlemen, or, if he does, he finds he has approached the wrong one every time. Once he puts himself in touch with an Artists' Exchange, such as is conducted by Mr. A. Ellis Jones, his worries are at an end.

The artist is in exactly the same position. The artist who is not in a printer's studio—who does not know the printers or their needs, who is himself unknown to fame and has never had his pictures on the line or sky-high in the Royal Academy show, is as a pearl in a desert, his market value is *nil*. He is known to a few friends who bring him into contact with the intermediary agent, and it is this modern phase of the middleman principle which brings about the long-looked for change. The work of the artist, hitherto hidden away in portfolios is brought to light. It is transformed from an unfinished, unmarketable commodity into something which readily finds a channel for its usefulness. All this is not done without due and careful consideration, and, moreover, it demands a " go-between " who is familiar with both sides of the question.

In the moving spirit of the agency under review we have a man who is a practical designer, who is familiar with every branch of lithography and process block making, who brings to bear on business the experience of many years. Nor can his capacity be compassed by even these qualifications, for he has an excellent knowledge of all the methods of art production and the means by which they can be translated to the printer's use. In a word, he combines the useful qualities of dealer in art and artist-critic and adviser.

Artists, as a rule, are not business men. Here and there is found an artist who has an abundance of business capacity. Was not Mr. Val C. Prinsep, R.A., a member of a shipping firm, and Sir Luke Fildes, R.A., a director of a well-known illustrated weekly ? Did not Cornelius Varley invent lenses and the graphic telescope ? It is the exceptions who are rare, and they are usually men of keen

business perception. The modern portrait painter delicately hints to his patron the custom of paying "half down" at the first sitting; 'tis all but the more mercenary-minded who shelve the business side of the question. It is somewhat foreign to the artistic nature to chafe and haggle over sordid matters of pounds, shillings and pence.

In the historic case of Miles Standish and John Alden we find that the intermediary or agent—or call him what you will—at length abandoned his master's errand and was, perforce, induced, perhaps, not unwillingly to further his own particular pretensions. It may be that he still has his counterparts within the "one square mile" of the city. But in the Artists' Agency the whole object is to place the artist's work in the best and most suitable hands, without cloak or hindrance. It is only by long experience that such a consummation can be reached.

In the present exigencies of trade not only does every progressive business man recognise the value of an agent, but in many cases he knows that it is his only means of access to the rarer articles which he requires. In this category can be placed artistic work of an original character. Artists are not always producing brilliant ideas, but when they do the agent takes charge of them and finds the right channel for their disposal. Many printers are constantly wanting novelties, in the way of fashion plates, catalogue covers, posters, soft goods labels, menus, programmes, book illustrations, book ornament and book covers. The last-named recalls the fact that many novels are sold mainly by the attractiveness of the cover, which too often is the best part of the book. Yet, writers must have good cover designs. These, with many other forms of illustration, are collected from all quarters by the artists' agent. The agent has at his call artists of all capacities, and can procure a design suitable to any purpose within the most reasonable time—possibly from his office portfolios. When, as in this case, the head of the concern is himself an artist, he can readily suggest how to adapt sketches to purposes to meet the most exacting conditions, and so this form of agency concentrates the straggling efforts of the artist—painter, sketcher or photographer—into a central depot, where publishers may readily find their needs supplied. It is often the occasional effort of an artistic brain which is of the greatest commercial value. The inestimable economy of such an agency is a boon to the publisher and the artist.

Finally, it has a more far-reaching and sympathetic character, as it is the means of bringing the work of artists otherwise unknown into the circle of trade. How many artists make sketches, rough ideas or exquisite photographs in their leisure time, which are full of life and activity, but which never reach the public eye. If this Artists' Exchange were more fully known, it is such an agency that would bring these products together, sift the corn from the chaff and present the publishers with the best of these individual efforts.

Headpiece, Initial and Tailpiece from designs by J. E. VINNICOMBE.

Concerning Waste.

By EDW. T. WARNER.

THE NET MAKER.

Photograph by
GILCHRIST BROS. ROBERT BRAID.

A WELL-KNOWN authority (Capt. Abney) estimates that from fifty to seventy per cent. of the whole of the silver used in photographic operations can be recovered by rigid adherence to the storing of so-called wastes.

If this is so, it is of interest to the process man to look keenly into the matter, to examine it carefully, and see if it is possible by a systematic method of accumulating "waste" product, to reduce the size of his silver bill. I say a "systematic" method, by this I mean one that will be in daily and hourly operation, yet working so smoothly and uninterruptedly that the actual economists are scarcely made aware of their economy.

The institution of such a method is intensely practical, and apart from the financial standpoint, it is a splendid training.

Although much might be said about the accumulation and treatment of waste in the other departments, in this short article I propose to confine my remarks to the studio. At some future date I may have the privilege of again writing upon this subject.

We will take for our illustration a process studio of the more modern arrangement, one in which there is a large sink adapted for general use. In some of the smaller houses the intensifying of the negative and the subsequent operations are conducted by the operators in their respective dark-rooms. In these cases, where it is possible, it is a good plan to utilize one room solely for this purpose of accumulating waste. Two moderate-sized water tubs erected on wooden platforms at each end of the sink are required. In one tub all the washings from dishes, bottles, etc., *suspected* to contain the least trace of nitrate of silver are deposited. The contents of the other, which will be found more lucrative, consist of old cyanide fixing baths, exhausted hypo baths, and worn-out toning solutions. A handful of common salt is thrown into the first tub at frequent intervals to reduce the silver nitrate to silver chloride. The chloride, being heavy and insoluble, falls and accumulates at the bottom, when the liquid above is syphoned away into the sink. If there is a great excess of salt, some of the silver chloride will be redissolved and lost, and this is to be avoided. Potassium sulphide of commerce is added to the contents of the second tub, and the liquid removed in the same way. At the end of six or twelve months the resulting deposits are taken from each tub, and carefully dried in separate crucibles, and the residues stored in wide-mouthed bottles kept for the purpose. All blotting papers used in the wet plate dark

slides are systematically collected together, and when there is a large accumulation reduced to ashes, and the ashes stored in a similar way.

Although it is now generally accepted that the best thing to do with these residues is to send them to a silver refiner, and ask for a wholesale quotation, it may be interesting, in conclusion, to glance at the methods by which the metallic silver may be reduced from these chemical combinations. To the last mentioned residue, nitric acid may be added, and the ashes boiled until no more silver is extracted. The solution of nitrate of silver thus formed is carefully filtered, and put aside to be purified and crystallized. The ashes may still contain silver chloride, and should not be thrown away. This may be dissolved out by adding a solution of sodium hyposulphite, and then depositing the filtrate in the second tub. The silver chloride residue may be reduced to metallic silver by heating in a covered crucible together with two parts of sodium carbonate, to which a little borax has been added.

The silver sulphide collected from the second tub may be placed in another crucible and subjected to a white heat, when the sulphur will be driven off, leaving the metallic silver behind.

A great amount of thought is expended by the heads of process firms in almost every conceivable way, with regard to cutting down expenses, but few men fully realize all that can be done by the exercise of a sound system of economy.

The Grand Canal, Venice.

Lascelles & Co., Ltd.

Photograph by W. Gamble.

The Preservation of Standard Reducers.

By JOHN P. GLOVER.

ANCIENT STEPS,
CHEPSTOW CASTLE.

Photograph by
ARC ENGRAVING CO. M. R. TOZER.

IN these latter days of process perfection and progressive methods, it is fatuous for a country experimenter to essay big things, and the wise dabbler confines himself to attention to the improvement of details for which the man of busy practice has no time.

Some time ago I devoted my energies to the question of reducing bromide exposure and development to an exact science, eliminating all error of these two processes. In this quest I was entirely successful, and in practice I now never make a "test exposure," and never lose a single print or enlargement from such errors.

Should our Editor consider this subject of use to the reader, the description shall appear in his next issue.

My last "Bunker" in the above investigation proved to be the problem of so preserving the developer that the last ounce withdrawn for use, after, say, six months from the date of making, should be exactly of the same reducing power as when first made up; and this feat I accomplished in such perfection that that last drop of a developer prone to rapid oxidation invariably tumbles into the phial as clear of tint and as free from imparted oxygen as the first withdrawal of pure reducer. Such a method of standardizing the development of process plates must be of inestimable value in every process dark-room, and without further preamble we will proceed to its elucidation.

Our illustration depicts a large wide-mouthed bottle, filled with the reducer or developer, in my case a metol-quinol developer in one solution, compounded after long experiment and since used universally for all development of plates or papers. I may add that in my experience the effects produced with this equal the best results obtained by any other known developer for any process required. The special formula is at the command of any reader interested, but does not come within the scope of this article.

The stock bottle is the largest size of "Citrate" bottle obtainable from any grocer for about tenpence, and it holds 200 ounces. For convenience it is graduated by pouring into the bottle repeated doses of 20 oz. of water, and after each administration scoring a level mark on the glass with a wet file, afterwards scratching the figures denoting the content on the glass with the wet point of the file. A large cork bung is fitted, and this is first bored with two holes the size of the glass tubing to be used, and is then well soaked in hot paraffin wax. To bore the holes, take a piece of metal tubing the outside size of which corresponds to the size of the glass tubing to be used. File the outside edge of the metal tube

to a knife edge, fix the other end into a handle, or pierce that end and insert a rod to form the handle, and use this borer wet, with a drilling motion of the hand.

You now require two small 4-oz. bottles, each fitted with a rubber stopper carrying two holes.

Take a length of glass tubing, and in a batswing gas flame form a smooth gradual bend at one end. Insert the other end through one hole in the cork of the stock bottle, and cut off the straight end until when in place it reaches the bottom of the stock bottle. Now attach beyond the bend an inch of rubber tubing, and continue with a straight length of glass tubing below the outside bottom of the stock bottle. Here two inches of rubber tubing are added, and

finally a short glass jet. Always wire all tubing joints with thin gauge copper wire, otherwise, some day you will surely find your bench and costly apparatus beautifully developed to a fine autumn tint in your absence.

Just above the jet, pinch the short length of rubber tubing with a "pinch-cock," costing twopence at any chemist's. This forms the tap, and to withdraw the contents the button ends of this are simply depressed, when the tubing opens and the liquid syphons out until the pinchcock is released, when the flow ceases. Through the second hole in the cork insert a two-inch length of glass tubing, and the stock bottle is complete.

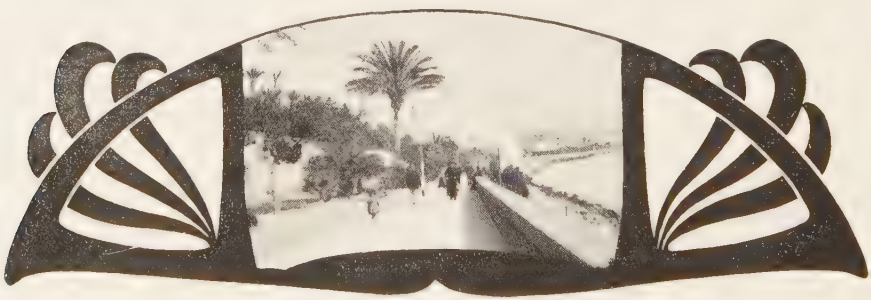
The absorber is next fitted. This again is in form a Woulf bottle, and thus the short length of tubing from the stock bottle is attached by rubber tubing to a length of glass tubing reaching through the cork of the absorber. A length of tube rising from the bottom emerges from this small bottle.

The third small bottle attached forms an overflow and is in construction precisely as the absorber, the final short outlet to air being, however, reduced at the top to a jet. Let not the confident reader neglect to provide this last bottle, thinking it a mere refinement of an idle brain, else, when the stock bottle is half empty, comes the first warm day along and lo ! the virulent contents of the absorber spread generally over everything of value in the dark-room.

The absorber is filled with a powerful fluid dissolving free oxygen and carbonic acid, etc. This is best composed of a strong solution of caustic soda, into which just before corking a quantity of dry pyro is added. The absorber bottle must not be more than half full. One charge may safely be employed for two full charges of developer made. The two small bottles are now tied by means of twine to the neck of the stock bottle and the stock bottle filled almost full with the reducer required. The syphon is now filled with clean water, inserted with the cork in the stock bottle and the short tube attached by rubber tubing to the *short* tube of the absorber. After wiring all joints, the cork of the stock bottle is made an air-tight fit by running paraffin wax carefully round by means of a heated metal rod.

On depressing the pinchcock a steady stream of liquid will flow, and will be replaced by pure nitrogen only from the air, all trace of oxygen, etc., having been absorbed in passing through the absorber. The incoming air must bubble noisily through the absorber, which is an indication that all is air-tight. The air first passes through a short jet into the empty overflow bottle, and from thence up the long tube (carrying with it any absorber which has flown back into it owing to expansion of the nitrogen in the stock bottle) and into the space above the absorbing fluid, bubbling on its way through the long tube which reaches beneath the absorber fluid. The space above the latter, connected with the space in the stock bottle by the short tubing which passes only through the stoppers, is filled always with pure nitrogen only, and this gas is absolutely inert, and has no action at all on the reducer stock.

Now, gentle reader, if you will construct this simple piece of apparatus, and watch the improved results on your work, the writer will feel that his little contribution is emerging in better pictures in the press



San Remo.

Vaus & Crampton, Ltd.

Photograph by
F. S. Earnshaw.

Amalgamated Press, Ltd. (Process Department).

Inks by John Kidd & Co., Ltd

Colour Reproduction for Natural History Text Book.

(Reprinted from the Children's Encyclopædia.)

Paul Pretsch and Photo-galvanography.

By MAJOR-GENERAL J. WATERHOUSE, I.A.

A Dairymaid.

Arthur Cox Photograph by
Illustrating Co., Ltd. Freckleton.

AMONG the pioneers of modern methods of photo-engraving, the names of Fox Talbot, Pretsch and Poitevin stand out prominently. They worked almost contemporaneously, in the early fifties of the last century, upon the same principle of the insolubility of gelatine and other colloids mixed with salts of chromium, dried and exposed to light, but they applied it in different ways. Talbot gave us the method of etching the chromated gelatine image with ferric perchloride, which is still followed in the photo-etching or heliogravure processes, while Pretsch and Poitevin produced incised or relief printing plates by electrotyping from the swelled gelatine film. The latter, however, is recognised more especially as the founder of modern photo-collotype methods, and Pretsch as the originator of the photo-galvanographic methods.

Paul Pretsch was born in Vienna in 1808, and visiting several foreign printing offices, became an experienced printer. In 1842 he joined the Imperial State Printing Office in Vienna under the direction of Herr Auer, whom he assisted in working out the process of nature printing. In 1850 he was sent to Paris and London, and in 1851 to London in charge of the Austrian printing exhibits at the Exhibition. In 1852, after his return, he began working out his idea of obtaining galvanoplastic reliefs by the swelling of insolated chromated gelatine films. In 1854, having perfected his discovery so far as to be convinced of its success in a wider field, he gave up his appointment in Vienna, and went to London. He took out an English patent, No. 2373, dated 9th November, 1854, for "Improvements in producing Copper and other Plates for Printing," and in the following year the Patent Photogalvanographic Company was formed, with works at 8, Holloway Place, Holloway Road, Islington, for working it.

In 1856, the publication was commenced of a work entitled *Photographic Art Treasures*, in folio, of which five parts, each containing four plates, appeared. This is interesting as the first publication of photographically engraved reproductions of works of art. Many of the plates were exceedingly good, considering the novelty and inherent difficulties of the method and the necessity for more or less retouching. The Company broke up after two years, and Pretsch was left to work his process alone. At the Exhibition of 1862, in London, he exhibited half-tone photogalvanographic plates in intaglio and in relief, and obtained the only medal awarded for that class of work. He did a good deal of work in illustrating the *Journal of the British Museum*, and otherwise, but found it, however, difficult to get on in London, and after a serious illness he returned to Vienna

in 1863. He was taken on again in the Imperial State Printing Office, but his health had broken down and he made no further progress in perfecting his methods. In 1873 he died of cholera.

In his English patent of 1854, he stated that his invention consisted in adapting the photographic process to the purpose of obtaining either a raised or a sunk design on glass or other suitable material covered with glutinous substances mixed with photographic materials, which designs could then be copied by the electrotype process, or by other means for producing plates suitable for printing purposes, or could be applied for producing moulds applicable for obtaining plates.

He gave no exact details of his methods of working because they could be variously modified. The sensitive coating was prepared by making a solution of about two parts of clear glue in about ten parts of water, using more or less of either, as might be required, and to one part of a strong solution of nitrate of silver and one part of a weak solution of iodide of potassium, each in a separate glass, he poured a small quantity of the glue solution. The remainder of the glue solution was kept warm, and a strong solution of bichromate of potash well stirred up in it. The glutinous solutions of nitrate of silver and iodide of potassium were then added and the mixture strained for use. He next took a clean plate of glass, a silvered copper plate or other suitable plate, and having set it quite level, poured the above mixture over its surface, so as to form an even coating when completely dry. The print, or other subject to be copied, being laid on the prepared coated surface, they were placed together in a photographic copying frame, and exposed to light. After sufficient exposure, the plate was removed from the frame, and washed, either with cold water, or a solution of borax or of carbonate of soda as might be necessary. The photographic picture or design appeared in relief, and when sufficiently developed was washed with spirits of wine. The surplus moisture was removed, and the plate covered with a mixture of copal varnish, diluted with oil of turpentine. After some time, and before becoming quite dry, the superfluous varnish was removed with oil of turpentine, and the plate immersed in a very weak solution of tannin or other suitable astringent. During this part of the process the plate was carefully watched and removed as soon as the picture or design was considered sufficiently raised ; it was then washed in water and dried. It was then ready to be copied by the customary methods of rendering the coating conducting and placing it in the electrotyping apparatus, or by making a mould from the coated plate, which, being subjected to the electrotype process, would afford the required printing plates ; or sometimes the copying could be done by the stereotype or other like process.

Or, secondly, he proceeded by coating and exposing the plate as above, but after washing with spirit of wine the plate was dried and in due time the picture or design would appear sunk, like an engraved plate. The printing plates were produced therefrom as above described.

A third process was to apply printing-ink to the coating of the plate prepared as above, taking the impression upon paper laid thereon, and transferring it to stone or zinc to be printed by the usual methods.

Instead of iodide of potassium, the bromide or iodide of ammonium might be used to shorten the exposure, and the copy could then be obtained by the photographic camera instead of the copying frame.

At a meeting of the Photographic Society of London on the 5th June, 1856, Pretsch exhibited specimens of his work in various stages, and read an interesting and suggestive paper on " Photo-galvanography, or Engraving by Light and Electricity," in which, without going into details of manipulation, he explained

the principles and applications of his process, founded on the peculiar properties of glue and gelatine mixed with chemical ingredients and rendered by the influence of light more or less hard and soft, so that they can be raised or sunk, can be kept soft or made firm, can shrink, swell and become enlarged or magnified. He also explained the different ways of producing an intaglio plate.

I. 1. An ordinary positive on glass or paper.
2. The raised picture on the coated glass reversed.
3. The mould, sunk, right position.
4. The first copper plate, the matrix, raised, reversed.
5. The second copper plate or printing plate, right.
6. The print reversed.

II. 1 and 2 as in I.
3. The copper plate deposited in the electrotype apparatus immediately upon the coated glass glate. The picture intaglio and right.
4. The print from it reversed.

If, however, the positive be reversed or the original placed face upwards in the copying frame, the print will appear right.

III. 1. The positive original on glass or paper.
2. The coated glass plate with picture thereon, sunk, caused by the use of a gentle warmth ; the picture reversed.
3. The mould raised, right position.
4. The copper plate sunk, reversed.
5. The print therefrom, right position.

He also described methods of surface printing, but they were apparently not perfected till later.

In the course of the discussion Pretsch stated that he thought the granular appearance of the films was due more to the formation of silver chromate rather than to the iodide. (*Photo : Journal,* Vol. III., p. 58).

In the same journal, Vol. V., 1859, pp. 109 and 132, there is a reprint of another paper by Pretsch on " Photography subject to the Press," in which he gives his reasons for abandoning the etching methods of photo-engraving in favour of the photo-galvanographic and gave a short sketch of his method, stating that the granulation was a distinctive feature of it, and was indispensable for the reproduction of any tint by a printing plate. He also discussed the question of " touching up " and the necessity for it owing to the imperfections of the originals, and described the electrotyping process and the advantages of his process of reproduction over hand engraving.

Again, in Vol. VI. of the same journal, 1859, p. 1, there is another paper on " Photo-galvanography, or Nature's Engraving," illustrated with a plate from a negative by O. G. Rejlander, " I pays," which is interesting not only as a good specimen of the process, but also because it is an early example of the process of *acierage,* by which the electrotyped plate was coated with iron and so was made capable of yielding the large number of copies required, instead of having to prepare a number of duplicate plates or make a transfer to stone with very inferior results. A description of the *acierage* process is given by Mr. F. Joubert, the inventor, in the same number of the journal.

An examination of this and other prints from Prestch's plates in Dr. Eder's *Geschichte der Photographie,* Volkmer's *Die Photogalvanographie,* shows that they have a very fine grain, more like a chalk grain on stone, than the vermicular gelatine grain seen in Placet's photo-engravings or in collotype plates. There is some falling off of detail in the lights and a certain roughness about them, with an irregularity of outline in places due to uneven swelling of the gelatine.

This is seen more particularly in the reproductions of line work given in Volkmer's book, in which the author has given a full description of Pretsch's and other methods and also a good portrait of Pretsch. The same irregularity is visible in Poitevin's reproduction of line work in his *Traité de l'impression photographique sans sels d'argent*, in which he has described his early researches in photo-engraving.

The most detailed account of Pretsch's process of intaglio photo-galvanography was given in the *Photo : Correspondenz*, 1874, p. 180, by Joseph Leipold, a former co-worker, and director of the Engraving and Galvanoplastic Section of the National Printing Office in Lisbon.

He starts with a photographic *positive* on glass. It must show all the gradations of the picture completely in their proper density and brilliance. The glass must be perfectly plane, as also the glass serving as a support for the sensitive mixture, in order to obtain close contact.

After repeated experiments the following formula was fixed upon.

I.	Glue (preferably Cologne glue),	15	grammes in	90	c.c. water.
II.	Bichromate of potash	2	,,	45	,,
III.	Silver nitrate	1	,,	45	,,
IV.	Potassium iodide.....	0·5	,,	30	,,
V.	8 drops of acetic acid to be added later.				

The glue is soaked in the water for some hours, then dissolved at a moderate temperature in a water bath, as also II., III., IV., to which one part of the warm gelatine solution may be added; then II. and III. are added, with stirring, giving a dark red solution; then adding IV., silver iodide is formed which lightens the colour. Finally, the acetic acid is added and the mixture strained through double linen. The warm filtered solution is then poured over the glass plates, set truly level in a drying oven, and spread evenly with a glass rod. The addition of the acetic acid facilitates the even spreading and the subsequent formation of grain will be finer and softer. The heat of the drying box must not be too high. At a temperature of about 98° F. the plates should dry in three to four hours.

The prepared plates should be kept for some hours in a dark place before exposure, so that an oxidation of the surface may be produced which will greatly influence the formation of grain in the later development of the picture.

This must not, however, be unduly prolonged, otherwise the coating loses sensitiveness and will only give bad and flat pictures. It is otherwise when the plates are placed in a warm room and dry in about twenty-four hours, when the oxidation takes place during the longer drying at a lower temperature. This method of drying is not recommended, because the plates may easily be spoilt by it.

No definite rules can be given for the exposure of the coated plates under the positive cliché. It depends upon the quality of the positive and the strength of the light. A strong positive with dense shadows will require a long exposure, but it should only be given in the shade, preferably at a window away from the sun. Direct sunlight makes the image hard with loss of half-tone and consequently useless. The exposure is a difficult matter only to be learnt from experience. After a certain time the image will appear more and more distinct, but until all the details in the shadows appear the exposure is incomplete. His plates were exposed for three to five hours, in daylight, and sometimes he protected the deep shadows by covering them with a mixture of gum and lamp-black.

With proper exposure the subsequent operations for the development of the image are easy. The plate is first immersed in a bath of 1 part of alcohol to 15 parts water, which does not develop the image so quickly as water alone would. After a few seconds it is taken out and dried off quickly with blotting paper. On

examination it will be found that only the stronger shadow parts and outlines have risen and are grained. The full development of the image should not, however, follow too quickly so that the glutinous coating may not take up too much moisture and the grain become coarse. The damp plate is left in the air for a time to dry and the damping and drying are proceeded with at moderate intervals till all the details of the image are developed. It is then thoroughly dried for some hours in the air and finally placed in water to remove all remaining bichromate salt, and the picture will then appear completely developed.

In order to transform by galvanoplasty such a relief with all its delicacy into a metallic plate suitable for printing, it is first necessary to make a perfect mould of some substance suitable for electrotyping. Those acquainted with the subject will know the difficulties attending the making of electrotyped copies from ordinary engraved plates, but with these very soft and delicate reliefs they are greatly increased. Paul Pretsch considered this the most difficult part of the whole process. He used oily and resinous substances mixed with gutta percha, which became liquid when heated, and in that state was poured on the reliefs. He himself, however, had not been successful with gutta percha and used the following composition :—

I.	Spermaceti	420 grammes.
II.	Stearic acid	200 ,,
III.	White wax	170 ,,
IV.	Asphaltum	70 ,,
V.	Plumbago	70 ,,

The asphaltum is first melted, then I., II., III. are added to it. When all are completely melted with constant stirring at a temperature of about 190° F. the plumbago is mixed in.

This composition has many advantages for the above purpose. It becomes fluid at a low temperature and so easily sets on the soft relief. It hardens when quite cold and there is no fear of the mould being spoilt by the brush when making it conductive with plumbago, and it separates easily from the gelatine relief. This composition has been used for all sizes of moulds and has always easily given brilliant and perfect matrices.

After the complete development of the image in the last water bath, it is well dried with blotting paper. The grain will, however, appear too strong and the image too high. The glue image has expanded from excess of moisture and this is the origin of the strong coarse grain. In order, therefore, to reduce this moisture and give the relief the necessary fine granulation and other properties for the subsequent printing of the plate, the moist surface is struck in all directions, especially the deepest shadows, with a fine brush, so that the relief may be to some extent again dried and contracted and the grain become finer and softer.

The image being thus ready for moulding is surrounded with a frame of four metallic strips and the composition heated to the melting point, poured on from one corner. The separation of the mould from the relief picture is easily accomplished, if after the mass has set and somewhat cooled, the glass plate is turned upwards, when separation begins. It is then only necessary to lift the glass a little at one place when it will separate entirely. From the ease and certainty with which the moulding process is carried out, as well as from the brilliant and complete characters of the mould itself, the operator can finish his work, if carefully carried out, with certainly satisfactory results.

When the mould is quite cold, it can be made conductive with the finest graphite. The image will not suffer from the soft brush being taken carefully over it. It will become more brilliant and at once ready for electrotyping.

Placet improved on Pretsch's process by coating sheets of mica or other thin transparent material with a similar sensitive coating, but exposing them under the positive from the back, by which means the irregular swelling of the gelatine underneath the printed picture was obviated and the resulting relief represented more truly the lights and shadows of the picture.

These and other similar methods of electrotyping directly from the coated plate were succeeded by those in which a positive pigment print was transferred to a glass or polished copper plate, developed with warm water, then dried, made conductive and electrotyped. They have been largely used for map work in line and also for half-tone subjects, but electrotyping is always more or less tedious and uncertain, and the methods based on it have now almost entirely been superseded for half-tone work by the Klic process, in which a positive pigment print from a reversed negative is transferred on to a copper plate grained with powdered asphaltum and etched with perchloride of iron, as first suggested by Fox Talbot.

It is interesting to note that this supersession of the photo-electrotype methods by the photo-etching methods, like Talbot's photo-glyphy, was foreseen so far back as 1859 by a writer in the *Photographic News*, Vol. III., p. 28.

In any case Pretsch did good work in demonstrating the practical possibilities of the photo-galvanographic methods of photographic engraving, and his labours merited fuller recognition and reward.

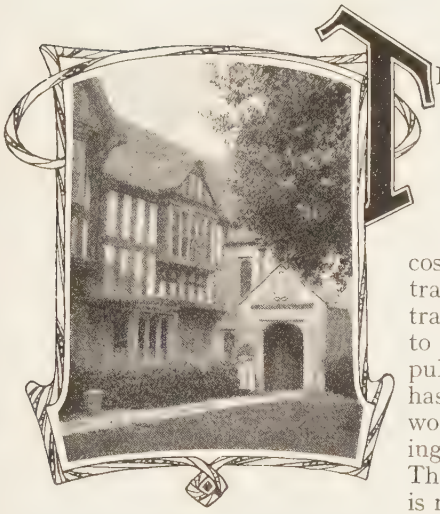
"What Have You Caught?"

E. Hamel & Co.

Photograph by Freckleton & Co.

Methods of Reversing Transfers for the Off-set Machine.

By JAS. CRAWFORD.



LITTLE WALFORD MANOR.

VAUS & CRAMPTON, LTD. Photograph by DR. ENGLAND.

THE introduction of the offset rotary machine and its adaptation, particularly to commercial printing, has called for either an engraving or drawing made the correct way or contrary to the usual method necessary in lithography. To redraw or re-engrave the existing plates originally made for stone printing would be a costly and unnecessary expense when a reverse transfer can be quickly made by any capable transferrer exercising ordinary care. If the transfer to be reversed is required from an engraved plate, pull it in the usual way upon a transfer paper that has a hard adhesive in its composition, or, in other words, does not become too " tacky " upon damping ; the necessity for this will be apparent later. The transfer having been removed from the plate is now ready to be stripped or reversed, and can be done in the copper plate press or the hand litho press in the following manner.

First trim the margins of transfer to the edge of the plate marks, lay it face up upon a stone which has previously been fitted in the press, in the direction it will get the shortest pull ; then take a piece of well-rolled Scotch transfer paper slightly larger than the transfer to be reversed, that has been in the damp book sufficiently long to become just limp ; place this upon the dry transfer and pull through under firm pressure ; the two papers will adhere, but are easily parted by holding them for a few seconds over the hot plate and gently pulling them apart.

Should any difficulty be experienced in parting them it is because either the composition on the paper is too " tacky " or it has been over-damped ; it is not advisable to damp both pieces of paper.

If a number of transfers are required from the same plate it will be best to put the reversed transfer down on stone as an original, and pull further transfers from it ; more uniformity in the work will be obtained.

If reversed transfers are required from stone, zinc or aluminium plates, pull transfers upon a good hard and smooth surface transfer paper, a paper that does not absorb the ink too quickly, and then at once strip upon another piece of transfer paper by pulling through the press under a fair pressure and not too soft a backing. In this case good results can be obtained upon dry paper. When

reverse transfers are required upon French transparent paper it will be found better to pull the first transfer upon a strong paper and strip upon the French. If register is not of importance, excellent transfers can be obtained by first pulling upon a smooth hard paper, and then stripping upon a damp rolled Scotch paper, or ever-damp paper ; in any case where damp transfer paper is used it is always advisable to put a strip of thin tracing paper along at least one edge between the papers before pulling ; this prevents sticking and allows one to pull them apart better. A word as to the mixing of the transfer ink may be of assistance ; always break it down with strong varnish only and loosen with a few drops of Calvert's No. 5 carbolic acid ; this will keep transfers sharp and will go down firm.

Reverse transfers can be made by the rubber pantograph by transferring the impression to paper instead of to stone or plate, as is usually done.

In making photographic negatives to be used for litho paper transfers for offset machine the negative must be reversed, but negatives to be printed direct to plate are not reversed.

Sorrento, on the Beautiful Bay of Naples.

Expert Engraving Co.

Photograph by S. J. Beckett.

Art Reproduction Co., Ltd.

Photograph by Ellis & Walery

Miss Kerslake.

Hood & Co., Ltd., Middlesbrough.

Paynetype Reproduction.

An Old Surrey Inn.

Bourne & Co.

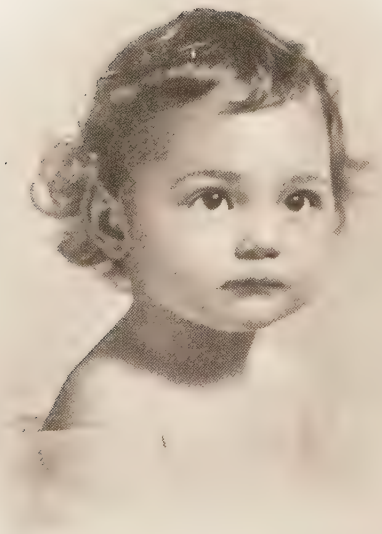
Photograph by Dover St. Studios.

Ethel Matthews.

Al. Engraving Co.

Photograph by Reinhold Thiele & Co.

Mdlle. Méri.



Expert Engraving Co.

Photograph by J. Bacon & Sons.

Child Study.

Photochrom Co., Ltd. (Copyright).

Inks by E. N. Frankenstein & Co

Queen of the Roses.

The Decadence of Aquatint and Etching in England.

CHARLES HARRAP.

THE OLD WATER WHEEL.

GRAPHIC ENGRAVING CO. Photograph by W. BUCKWORTH

IN coupling aquatint and etching in one consideration, it is not because of their similarity in methods of production or owing to anything in common in their appearance. It might have been equally appropriate to have included Mezzotint as a little-used art, were it not that the methods of this art are not so much applicable in the same manner or to the same extent in producing a print as aquatint and etching are. The force of the present retrospect is not to trace the disuse of these arts as a matter of historical interest, but rather to survey the matter as a commercial problem.

To briefly recall the progress of these arts it is recorded that whatever was done by H. Zeghers about 1660 in the way of introducing aquatint very little information exists, and that the use of the method commenced with Jean Le Prince about 1750. He may have followed up methods already devised by the Abbé St. Nou. From Le Prince the method was introduced into England by the Hon. C. Greville, who described it to Paul Sandby, and he made the first aquatint plate in this country in 1774. His improvements of the process, and probably his inception of the spirit ground, gave it a great impetus. It became popular as a means of illustration, including landscapes, topography, architecture, caricature and costume. Such limited references to its application do not convey adequately the extensive field of its adoption. It was used largely and took a very strong hold upon writers during the close of the 18th and beginning of the 19th centuries. For example, a book describing the tour of Sir John Carr in Holland, down the Rhine, and in the south of Germany in 1806, was published by R. Phillips, 6, Bridge Street, Blackfriars, in 1807, containing twenty-one full-page plates, or an average of one illustration to every twenty pages of text. The views were 8 in. by 6 in. The sketches were made by the author and produced by aquatint in black and a tint. They are excellent as topographical studies, they contain considerable artistic merit and are an embellishment which any author might well feel proud of. Take also "A journey from Edinburgh through parts of the North of Britain," by Alexander Campbell, in two vols., published by John Stockdale, Piccadilly, in 1811. This work of 800 pages contains forty-four plates 8 in. by 5 in., produced in aquatint in black and a tint, by Pickett,

T. Medland, F. Jukes, Alken and J. Walker, from sketches by the author. These plates, although meritorious, are not equal to those in the book by Sir John Carr, mentioned above. These are but a tithe of the large number of books illustrated by aquatint. From about 1800 Ackerman and Orme and others published many books similarly treated ; and the works of Sandby, Malton, Daniell, R. and D. Havell, J. C. Stadler, T. Sutherland, F. C. Lewis, G. Scharf, W. J. Bennett, T. Fielding, S. Prout, R. Golding and others stand out as prominent expositions of the art. It was not confined to productions in black or monotone, but was used both as a means of printing in colours and for executing the monotone print upon which colours were washed to give a full realization of the subjects. Notwithstanding the introduction of lithography, aquatint held its position as a means of illustration well up into the middle of the 19th century, in England. To the general observer it may appear to have fallen into disuetude ; but a closer inspection of the work of Baxter, Kronheim, Le Blond, Dickes and others who used the Baxtertype process will reveal that aquatint played a very important part in the beautiful prints in oil colours which claimed the public favour from 1835 to 1865, and even later. It was not the aquatint of the older workers ; the earlier work and, it may be said, the true aquatint was intaglio, whilst the later application of it was in relief. Even during recent years the survival of a form of aquatint in relief may be seen in the coloured work of " The Graphic." From the artist's point of view it cannot be said that aquatint survived much after 1860 ; as at about that time lithography had had a very large patronage of artists, and etching was accepted as a freer method of artistic expression.

Etching is of older origin and later survival. Albrecht Dürer produced etchings from 1494 onwards until his death in 1528. Rembrandt executed some of the best before his demise in 1669. So far as etching in England is concerned it is recorded that Wenceslaus Hollar came to England, and in 1640 commenced the production of etchings. He left the country during the Civil Wars and returned about 1652 to continue the art, but died (1677) in poverty in Westminster. Hollar's etchings included portraits of James II. and others, Antwerp Cathedral and Greenwich. He also produced a series of costumes of European ladies, thus showing the diversity of the work attempted. Etching remained dormant for over a century, until revived by imitators of Rembrandt, including B. Wilson (d. 1788), Capt. W. Baillie, T. Worlidge (d. 1768) and the Rev. R. Byron.

J. M. W. Turner produced etchings from pictures about 1808 to 1820, but he frequently used Mezzotint as an adjunct. T. Rowlandson (d. 1827) did etchings in colour about 1800. J. T. Smith (d. 1833), F. Francia (d. 1839), W. Delamotte (d. 1863), G. Vincent (d. 1830), J. S. Cotman (d. 1842), Sir E. Landseer (d. 1873), T. Landseer (d. 1880), C. G. Lewis (d. 1880), E. W. Cook (d. 1880), S. Palmer (d. 1881), J. Crome (d. 1821), R. Redgrave (d. 1888), Oliver Hall, Rev. E. T. Daniell (d. 1842), J. Gillray (d. 1815), Dighton, Alken used etching largely as a means of illustration and copying pictures, in the end of the 18th and beginning of the 19th centuries. The art was well maintained up to nearly the end of the 19th century by C. W. Cope (d. 1890), R. Ansdell (d. 1885), G. B. O'Neill, F. Taylor (d. 1889), T. Creswick (d. 1869), J. C. Horsley, Sir J. E. Millais (d. 1896), J. C. Hook, W. H. Hunt (d. 1910), J. Pettie (d. 1893), J. E. Hodgson (d. 1895), C. S. Keene, P. Calderon (d. 1898), M. B. Foster (d. 1899), R. Caldicott (d. 1886), G. du Maurier (d. 1896), C. P. Slocombe (d. 1895), W. B. Hole, R. S. Chattock, C. W. Sherborn, J. B. Clark, E. Edwards, J. P. Heseltine, J. Macwhirter. The works of Sir F. S. Haden, J. A. McNeill Whistler (d. 1903), A. Legros, David G. Cameron, stand out as high examples of the art.

These names have been quoted at random without any attempt to classify

them, either as to their respective works or the influence they have had upon other etchers or schools of etching. The list of illustrious names serves to show how well the art has been maintained, and if it may be said to-day, as it was ten years ago, that many etchers exist well trained in this artistic craft there would not be much need to deplore its neglect. There is, however, a clear line of distinction between the artist who etches as a hobby with no other end in view, and the artist who uses etching coupled with other arts as a means of producing the highest class of picture or print in colours. The photo-mechanical processes of producing pictures, such us photogravure, photogravure in colours, and Frey's screenless lithography have no doubt so nearly met the average demand that anything still more delicate and chaste has been neglected. Ten years ago, when a masterly work on colour prints was produced, it was illustrated with actual examples, which were worked from a photogravure basis instead of from Mezzotint engraving. In a general way it met the case ; but not so to the connoisseur or to the large number of gentlemen who are art lovers and can afford to indulge their desires. Too often work is undertaken purely for commercial gain, and the increasing craving for wealth obliterates the better feelings. It may be said without fear of contradiction that aquatint, line and stipple engraving are almost neglected ; that photogravure processes have virtually supplanted them ; that etching is only used as a means for artists to give expression to their own ideas. The result is that the etcher who can use Mezzotint or aquatint methods in combination is very scarce, and the artist who will work these methods as a commercial industry is a still greater rarity.

The fact of these methods having been neglected may be taken as sufficient indication they are not wanted. This view is rather a narrow one. The much greater artistic merit of everything manufactured to-day is scarcely traceable to the public demand for it. The improvement has come from within ; the demand has been created by placing beautiful articles on the market. The same applies to the artistic printing processes ; if a proper combination of methods were adopted the prints submitted to the public would create a demand. This is readily seen in the enormous demand for the prints by the Frey process.

No. It is a question outside popular demand. It is a slackening of enterprise amongst British producers ; a lethargy which is fraught with evil results. Englishmen claim freedom and initiative as their special traits, which have in the past made England what it is. But that is no excuse for allowing the printing of art productions to drift slowly away. If it were otherwise there would be no need for this critical dissertation. But it is not otherwise, and it can be amply proved by inspection of the glorious products of the art publishers of France. There are some who may say that France is a decaying nation, adhering to old traditions and sapping its own vitality. Such a statement is only made to cover up our own inaptitude ; it fails to recognise the individual wealth of that vast community, and the extent of its artistic resources.

England has not failed only in maintaining its aquatint, stipple and line engraving, its combination of such processes for publishing purposes, but it has neglected to retain the fine art of stone engraving which is practised so largely in Continental countries and in the United States. It may be safely said that we are allowing our artistic skill to drift back to the continent whence we derived so much of it in bygone days.

The production of high-class illustrated books in France has reached a stage which few Englishmen have any knowledge of, and the remainder never dream of.

Thirty years ago there was a strong outcry as to the decline of engraving ; it was pointed out that, from 1837 when line engraving was the art of the day, it

was neglected so much that by 1860 it was reaching a stage when it had almost faded from public knowledge. It may be truly said that even after that time there was a large amount of line engraving, as evidenced by the productions of the once glorious firm of J. Virtue & Co. It may be said that this firm continued to use it well up towards 1890, after which there can be seen a real decline, without hope of revival. The practice of making engravings of the best pictures of the year, such as Elizabeth Thompson's Crimean, Belgian and Oriental subjects, was maintained up to 1890. But carbon printing and photogravure have gradually supplanted it. In fact the old race of engravers has died out.

In 1887 it was deplored that photogravure had its home in France, and notwithstanding the advances made in this country, it may still be said that photogravure in its finest state and in its extensive use remains in France and Germany. When copper-plate line engraving began its final decay about twenty years ago, there was a great revival of etching, which has more or less maintained an appreciative hold upon the public. The etchings of to-day by such master hands as Herbert Dicksee, Frank Dicksee, William Hole, R.S.A., Sir Luke Fildes, W. Wyllie, C. Wilfrid Ball, John Collier, F. Short, Hedley Fitton, Mortimer Menpes, Axel Haig, A. Bowerley, P. Pinlott, N. Partts, F. Brangwyn, W. Strang, C. J. Watson, R. W. Macbeth, Prof. H. von Herkomer, L. Smythe, David Law, C. W. Rhead, C. O. Murray, Sir C. Holroyd and Gilbert Hamerton show how beautifully art may be translated through this medium. But whilst some of these artists do a little Mezzotint, it is seldom that an aquatint pure and simple, or a combination of aquatint and etching comes from their hands.

The figures of the Printsellers' Association are interesting records, of those prints which year by year received the Association stamp and became registered publications. To a certain extent these figures are a gauge of the artistic trend of the period. It is unnecessary to quote the whole of the figures for the past thirty years, but simply to take them at intervals of ten years, with a series of figures for the last four years.

PRINTSELLERS' ASSOCIATION STAMPED PUBLICATIONS.

Nature of the print.	Nos. of such prints stamped in the separate years.						
	1879	1889	1899	1906	1907	1908	1909
Line engraving	10	1	5	1	—	1	—
Dry point	—	3	—	—	—	—	3
Stipple engraving	1	—	—	10	12	47	26
Mezzotint engraving	30	32	22	30	34	49	64
Etching	—	119	39	49	36	28	26
Proof etchings, published by J. Virtue & Co.	—	—	9	—	—	—	—
Mixed—combining stipple, line, etching, Mezzotint	20	15	1	3	8	—	4
Photo-engraving or Photogravure.	4	11	69	11	5	16	1
Goupil photogravure	—	15	7	—	—	—	—
Photogravures published by Franz Hanfstaengl	—	—	16	—	—	—	—
Prints published by Berlin Photographic Society	—	14	—	—	—	—	—
Total prints stamped	65	210	168	104	95	141	124

Even from such figures it is difficult to form a definite conclusion, because some intervening years might make up for the deficiences of others. One thing

is quite apparent, and that is the number of prints registered is declining. Further that the actual hand methods of engraving, stipple, dry point, line and the mixed methods have almost disappeared. In 1879 there were thirty-one such prints, in 1889 nineteen, in 1899 six ; and in the last four years they reached an aggregate of twenty. Etching, which in 1879 was not represented, sprang into great favour in the succeeding ten years, but has since gradually declined. Mezzotint, however, has maintained a steady patronage, and in the thirtieth year there were more than double the number of prints of the first year recorded in the table. Of the mechanical methods, it appears that the ordinary half-tone or three-colour has not yet entered the category of the printsellers' transactions ; but photogravure has been fully recognised as an art production. This process has had its periods of eminence, in the ten or more years 1889-1899, since which it has only maintained a moderate representation. In the last available year's records (1909) the only photogravure was that of the horse " Persimmon," from the picture by Mr. A. C. Havell.

Although these figures convey some impression as to the art work in engraving, it should be borne in mind that they do not actually represent the entire output in the years named, and should not be accepted as a definite record. All that can be said is that engraving as a handicraft—whether as a hobby or for commerce —has considerably fallen off, and has given place to mechanical methods in this country.

The same criticism holds good to-day that was uttered in 1887, that if we want " productions a little out of the common we must look to our friends abroad."

This is a stigma upon our elevated opinion of our own resourcefulness which should not be borne in silence. There is plenty of room for the fine art publisher in Great Britain. Most people have tired of the monotony of the three-colour process with its lack of transparency, and although the half-tone depicts things as they are, serving the purposes of instantaneous record, yet there are few who look upon the process print expecting to find any art in it. It is refreshing to turn over the magazines of Great Britain and America in the decade 1880-1890, and even later, to see the individualism which is thrown into the wood engravings, the life and fire of these artists with the graver—reminding us of the early days of lithography when the artist drew his originals in all their human vigour upon the stone.

Of the many artists who practise etching it is only reasonable to expect that some at least could devote themselves to the art required by the publisher. If they would inculcate their art of etching with a mode of producing colour plates such as aquatint—so that sketches could be reproduced resembling beautiful water colours in subdued tones, or even in more brilliant colouring, there would be publishers ready and willing to give them commissions which now pass over to France for production.

To bring the point at issue down to practical consideration it is within the power of many to inspect French books ; books of high merit, imported into this country in the usual paper covers so suitable for collectors who have them rebound in any binding to match their libraries or please their tastes. These books are published by such firms as H. Piazza et Cie., A. Blaizot, F. Ferroud Successeur and others, at prices varying according to the nature of each edition of one work from 200 frs. to 1000 frs. each.

Some of these works are illustrated throughout by exquisite wood engravings emphasized with a dash of colour—from wood blocks—here and there. Others are entirely illustrated by etchings, all pulled from the plates. Many of them have one or two original water colours, whilst some are full of water-coloured

prints. In a few cases there is a combination of etching and aquatint. The colours being pulled from aquatint plates. But of the finest stamp are those in which the whole illustration is the product of three etchings, all pulled from the plate. All these are actual prints, and come within the scope of the printer's capabilities. Yet the Frenchman does not stand at any expense to produce these works of art or editions de luxe, for there are many publications in which the subject is worked out in an etching, and the colours are all water-colour washes. It is unnecessary to traverse the whole catalogue of publications of this kind, but merely to mention a few to enable the Englishman to make his own inspection. Of the best may be named "Petits Poèmes en Prose," illustrated by Henri Héran; "Le Pater," illustrated by A. Mucha; "Cloches de Noël et de Paques," by the same artist; Antoine Watteau, illustrated by sixty photogravures; and fifty of A. Watteau's designs in colour (price £20); Déri Se'Adet, illustrated by F. Zonars, containing an original water colour, and hand-coloured etchings at £30; "La Dernière Nuit de Judas," illustrated by Gaston Bussière, with etchings in colour; "Les Trois Roses de Marie-Anne," with engravings and etchings by L. Lebègne; "La Courte Vie de Balthazar Aldramin," illustrated by Deygas and the etchings by X. Lesuer; "Rouen d'hier et d'au-jourd'hui," with wood engravings, coloured, by Eugène Dété; "Thais," compositions de Paul-Albert, etchings by Léon Boisson; "Mémoires du Comte de Grammont," with engravings and etchings by L. Boisson (£14):; and "Les Aventures du Roi Pausole," designs and lithographs by Pierre Vidal, the illustrations being in many cases hand-coloured etchings, price £18. These are but samples of what is being done in France. These books are printed on vellum, or Japanese or Chinese papers where possible, with beautifully decorated text, and borders in colour. They are possibly the choicest productions in books that have been placed before the public.

It may be true that books have been already published by British firms illustrated in a similar way. But it is there that the similarity ends. It is the extreme delicacy of taste displayed in the illustrations which makes each one a little picture in itself—a fantasy, a dream.

The days of art purchasing are not yet numbered, it might almost be said that such luxuries are on the increase if the publisher will only speculate in the right style of production. There is no reason for the decay; it wants but a little enthusiasm to revive the artistic skill and taste, to emulate the praiseworthy and exquisite work of our Continental neighbours.

TRUTH OR ROMANCE.

HALF-TONE ENGRAVING CO., LTD.

Photograph by
S. L. COULTHURST, F.R.P.S.

Soldering *versus* Stripping.

By H. THOMSON.

THE PICTURE BOOK.

Photograph by STUART.

THE ENGRAVING CO., LTD.

WHY do so many firms in this country adhere to the method of soldering together a number of small line plates when the method of stripping the films proves to be such a distinct saving all round? I have had a long experience in the trade, both in this country and in America, and from my experience in the latter country the line-etcher and the soldering-iron are practically unknown to each other.

One firm whom I was with for some years in Philadelphia have a tremendous amount of line work pass through their hands, and find it possible to keep a boy continually employed in doing nothing else but stripping large "flats" of films ready for the printer. The operators work without prisms, which means, in the first place, a large saving in exposures (and therefore electric current) in the course of a year. The stripping is done in a small room, kept as free as possible from dust.

As each negative is finished it is passed straight in to the "stripper," who immediately dries it and coats it first with rubber solution and then with collodion. The films are stripped on to glasses 18 in. by 20 in. by $\frac{1}{4}$ in. thick, and as there is a continual stream of the work going through, it is seldom necessary for the etcher to take up a smaller size plate than this. Of course, some amount of discretion must be used in seeing that fine and coarse jobs are kept as much as possible on separate plates. If by chance the etcher spoils any particular job, that film is simply stripped off and on to the next plate that goes through.

I have sometimes seen as many as twenty to thirty different jobs on one plate. Think what this would mean if the printer had to print each one separately! That 20×18 piece of metal would have to be cut up into twenty or thirty small pieces, and each piece would have to be sensitized separately. There would undoubtedly be a larger quantity of sensitizing solution used, and also of ink in rolling up before development. To this can also be added the larger items of the extra amount of gas and electric current burnt, and also the man's time. Then to save time in the etching, the small plates would have to be soldered together which, besides taking time, means certain trouble if the etcher is using the dragon's blood process, as every time he burns in his plate he will have a great chance of seeing it fall to pieces owing to the solder melting. It does not matter whether there is a large or small amount of the work being done, I feel confident that soldering would be entirely done away with if the method of stripping the negatives was only given a good trial. The method presents no difficulties, is in fact quite simple, and can easily be done by an apprentice if there is not sufficient of the

work to keep a boy fully employed on that alone. There are two or three methods, but the one I have always used is as follows.

Have ready first of all on your bench your rubber solution made up of pure Para rubber 5 ozs., benzole 80 ozs. Keep this well shaken until dissolved, and then filter ready for use. Now make up a bottle of stripping collodion :—

Sulphuric ether	35 ozs.
Methylated alcohol	35 ozs.
Pyroxiline	1 oz.
Castor oil	2 ozs.

This should also be thoroughly shaken and filtered, and should be made up about two days before using.

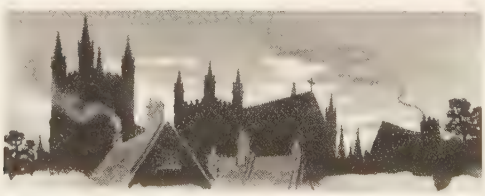
Next have ready a porcelain dish, capable of taking your largest negative, and half fill it with acetic acid and water—strength about 10 ozs. acid to 60 ozs. water.

Now, if you have sufficient negatives collected, dry them off and then, when cool, coat with the rubber solution. When quite dry again, coat with the collodion, and this time the drying may be hastened by setting fire to the collodion and allowing it to burn out. Be careful, though, that the plate does not get too hot. Now cut round the image, about $\frac{1}{4}$ in. away from the work, with a sharp knife and place the negatives in the dish of acid. After two or three minutes' soaking take out the top negatives, and try with the finger nail or the point of a knife whether the film will pull cleanly off the plate. If so, lift it right off, and transfer it to the large plate which you intend to use for printing from, taking care to reverse the film if the negative has been taken without a prism. Treat all the negatives in like manner, placing the films at least half an inch apart on the large plate, to allow for sawing up when the plate arrives at the mounters. When the plate is full up, take a sheet of soft paper, and after damping it, lay it carefully over the plate of films, and vigorously squeegee off the surplus water.

The plate may now be dried in the ordinary manner over a gas stove. Carefully press down with the thumb any films that show a tendency to curl up whilst drying, and when quite dry hand over to the printer.

Taking an average of twenty films per plate, the stripping could be comfortably done in less than half an hour, and the printer would only have one plate to print instead of twenty.

So this will give some idea of the whole saving as against the method of soldering plates together, or etching small plates separately. If taken up as a general practice, I strongly recommend the use of $\frac{1}{4}$ in. or $\frac{3}{8}$ in. plates for stripping on to, as there is far less danger of breakage if squeegeeing on an uneven bench or whilst drying over the stove. This method will be found to be simple and practical. There are other methods, such as coating with celluloid, instead of rubber and collodion, but I have found the above the most reliable and satisfactory.



EVENING.

Drawn by
W. GILLIARD.

BOURNE & CO.

Duotype.

The Photochrom Co., Limited. (Copyright.)

A Gipsy Encampment.

Photograph by James Hamilton

Dean Engraving Co.

Jim.

T. B. Browne, Ltd.

Photograph by S. W. Probert.

An Egyptian Lady.

Badoureau & Jones, Ltd.

Photograph by Rita Martin.

Electro from Half-tone—175 screen.

Photograph and Block by "Daily Mirror," with "Daily Mirror" Screen in the "Daily Mirror" Studio.

The "Daily Mirror" Engraving Department.

The London & Provincial Reproduction Co., Ltd.

Inks by Shackell, Edwards & Co., Ltd

The Pied Piper of Hamelin.

'... Could only follow with the eye
That joyous crowd at the Piper's back.'

Reproduced by kind permission of Miss Bottomley.

From a painting by Edward Gregory.

Some Experiments towards Rotary Intaglio Printing.

By R. B. FISHENDEN, The School of Technology, Manchester.

THE most striking development in illustration work of recent years has been the growing use of rotary intaglio printing. This system has been extensively adopted by calico and wall-paper printers for many years because of the large body of colour which can be transferred to the material being printed and the great speed obtainable.

It was only when the wonderful productions by the "Rembrandt" process became widely known, and the bare outline of the way in which they were produced became understood by a few workers, that the possibility of the extensive use of rotary intaglio printing came to be recognised. In the "Process Year Book" of 1905-6 I made a suggestion that probably this method might be used for the production of weekly illustrated papers with considerable success, and although the idea has not yet reached fruition, an even greater innovation has come about in the recently published process of Dr. Mertens & Rolff, which was referred to in the "British Journal of Photography" in August last, and the wonderful illustrations in the special editions of the "Freiburger Zeitung" produced in this way represent nothing short of a revolution in newspaper illustration. The paper contains some wonderful illustrations, which are apparently photogravures printed amongst the type matter; they are actually "invert half-tones" as distinguished from machine-printed photogravures. A comparative sketch of the method of production in the two instances may not be without interest.

Intaglio half-tones are produced by making the half-tone transparency from a continuous tone negative with practically the full range, as would be required in a "high-light" process, that is to say, the whites are quite free from any dots although the shadows should be sufficiently large to withstand the necessary amount of etching. The continuous tone negative used may with advantage have a certain amount of work put on it in the way of touching up, either with the air-brush or the glass side, or with actual sharp patches of colour on the extreme high-lights on the film side. This is done so that there shall be no difficulty in obtaining pure whites whilst retaining the next tones in their correct value.

Supposing a flat plate were to be prepared, a transparency would be printed on to the copper in enameline and then etched in the usual way, the only difference from the etching of a relief plate being that only a very slight depth is necessary. The proving of such a plate cannot be done satisfactorily to show the comparison with a rotary engraved surface by the ordinary method of copper-plate printing—(that is to say, the general inking of the surface and then a wiping away of the excess of ink with a wiping rag). The reason is that the rotary method of intaglio printing involves the use of the steel knife or "doctor" for the removing of the excess of ink from the surface. A flat plate can be proved with a knife edge as an experiment for comparative purposes by having a straight

piece of steel about $\frac{1}{32}$ of an inch thick set in a strip of wood, and then grinding down the edge at an angle of 45° on a flat hard metal surface with emery powder and water. Both sides should be treated in a similar way. This forms a very convenient substitute for the " doctor " or an intaglio printing machine.

The difference from the ordinary wiping is that the cavities are left quite full of the printing colour with the knife edge, whilst with the rag only a relatively small quantity of ink is left in the bottom of the cavities. When using the doctor, however, a much thinner ink must of necessity be used, otherwise the surface is not completely cleaned. In this connection the medium to be used for the printing colour must be quite different from an ordinary litho varnish for instance.

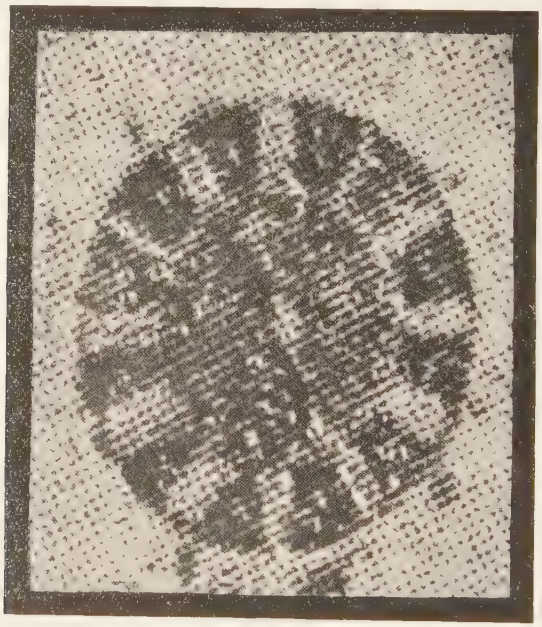


Fig. 1.
Rotary intaglio half-tone proof. × 10 diameters

The printing colour may be made from an amber or sienna photogravure ink or a high-grade litho ink, thinned with oil and wax varnish to about the consistency of cream. The plate is covered with the ink and the knack of removing the excess without the effect which is known as " drag," or pulling the ink out of the cavities on to the surface, will soon be acquired; several wipings in different directions will probably be necessary to make the surface clean, but that is not important for the experiment. It is not necessary to apply any test.

The paper for proving will have to be damped unless very considerable pressure is applied. A low-power photo-micrograph of an intaglio half-tone proof is shown in Fig. 1.

Rotary photogravure plates are made in an essentially different way and the proofs can always be recognised by the difference in appearance when magnified ; the appearance is shown in Fig. 2.

Whilst it is not possible for the majority of workers in an experimental way to have the use of an intaglio rotary machine, yet interesting results can be obtained by the same method, only making a flat plate instead of a rotary one. The work involves some previous acquaintance with the methods of Talbot-Klic photogravure, but the necessary information can be acquired from one or other of the excellent text books which are available.

The essential difference between Talbot-Klic photogravure and the plates

Fig. 2.
Machine-printed photogravure proof.
× 10 diameters.

Fig. 3.
Machine-printed photogravure plate.
The cavities are filled with ink.
× 10 diameters.

for rotary work is that in the first case the separate ink-bearing cavities are formed by means of a bitumen dust grain, the resulting plates being too delicate to stand the wear and tear of rotary printing, even supposing a dust grain could be applied to a rotary surface ; in the second case, the separate cavities are formed by means of the ruled screen. The character of the screen varies, in some cases a chess board screen being used, in others a screen with a thin transparent line, the latter now being produced commercially with the ruled surface at one face of the screen.

A print is made from the screen on to a sensitive carbon tissue, and this is mounted and developed on a piece of copper which has previously been prepared

as for ordinary photogravure. A print is then made from the transparency of the subject which is to be used on to another piece of tissue, everything being done exactly as for ordinary photogravure, and this is mounted and developed on the top of the screen tint and the plate is then allowed to dry. Painting in of the edges and the protection of any blemishes should be carefully done, otherwise serious defects will show in the finished plate.

The etching is similar to ordinary photogravure, excepting that the graded baths of ferric chloride are not so necessary, a strength of about 32°B. being satisfactory for practically the whole time of etching, although a weaker bath may be used towards the end. The length of time occupied in the process is greater than with ordinary work and a considerable amount of practice is necessary before this can be correctly estimated. When the resist is cleaned off the difference from the intaglio half-tone will at once be seen, for whereas in the photogravure plate the cavities for the lightest tones will be seen to be large, but very shallow, and in the shadows slightly larger, but very deep, in the intaglio half-tone the cavities are practically all of the same depth and varying size in the inverse way to what is seen in relief half-tone blocks. The difference imparts to the photogravure proof greater softness than is found in the intaglio half-tone, although the one is as easy to print as the other. The experimental flat photogravure plate may be proved with the knife edge in the same way as the intaglio half-tone plate, and an attempt to prove the first named by wiping will at once demonstrate the value of the knife edge for proving, because the wiping will remove practically all the ink from the lighter tones of the plate.

It has not been the intention in this brief summary to give detailed working instructions, but it is hoped that the information given will be sufficient to cause some of the more enthusiastic workers in photogravure to experiment in this new and important illustration method.

Initial and Tailpiece produced in the
Municipal School of Technology, Manchester.

J. T. Garside

Fardon, Howell & Co.

Barkisland Hall, near Greetland.

Metzograph Blocks from Ordinary Negatives.

By G. C. LAWS.

CANTERBURY.
THE RIVER STOUR.

DIRECT PHOTO ENGRAVING CO., LTD. Photograph by GODFREY BINGLEY.

THE use of the Metzograph screen in the printing box for the production of blocks from ordinary negatives, is a process which would well repay anyone desirous of getting away from the regular dot formation of the Levy screen, and the following notes of some experiments made in the Penrose laboratory may be useful to many process workers. The method is of interest because of the smooth and regular appearance of the grain, quite different from the effect obtained when the screen is used in the camera to make an irregular grain negative.

Thinking it was necessary to have the screen as close to the metal plate as possible, negatives were made on Kodoid films, so as to have only the thickness of the films between the screen and metal plate, but working under these conditions it was found that the result was nothing like that which was obtained when using the same screen in the camera ; the effect given was that of a coarse, lumpy-looking grain on the metal, showing clearly the result usually given by the screen being too close to the sensitive film, the best screen distance was found by partly coating, with a fine grain matt varnish, two or three pieces of glass of different thickness. These were placed in contact with the Metzograph screen, and by focussing with a magnifier on the edge of the varnish it was easy to determine by the appearance of the screen grain the best thickness of glass to use between the film negative and the screen, and the accompanying block was made with a piece of glass $\frac{3}{52}$ of an inch in thickness between the film negative and screen.

In the course of these experiments it was found that after placing the screen far enough away to avoid the coarse, lumpy effect due to the close screen, that any increase in the distance up to a $\frac{1}{4}$-inch did not alter the character of the grain so much as it did the gradation from black to white, the greater distance giving hard, chalky results, and the nearer the screen the longer the range ; so that for very soft negatives a greater screen distance should be used than would be required for a negative with a longer range of contrast.

As a guide to the type of negative used the following data may be useful. Time of day, 2 p.m., cloudy sky ; Wynne meter time, 8 secs. ; exposure, $\frac{1}{4}$ sec., *f*/16, developed two minutes in amidol 3 grains to the oz. ; no bromide. This

gave a soft negative, full of detail and without excessive contrasts, from an open landscape on Kodoid film.

Having obtained a suitable negative the method adopted for the block making was as follows. An ordinary spring-pressure frame, box pattern, with a $\frac{1}{4}$ in. plate-glass front was used ; first, the screen laid on the glass grain side up, then the $\frac{3}{32}$-in. glass, next to this the film negative, and finally the sensitized metal plate, the whole kept in contact by the spring pressure. The frame was then placed in the bottom of the Metzograph printing box and the light from an open arc lamp was projected by means of a single condenser till the circular disc of

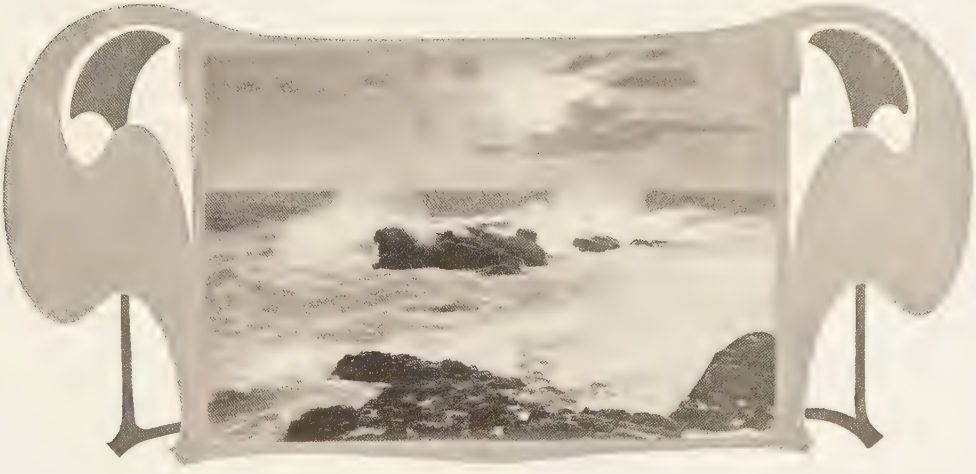
light evenly illuminated the whole of the negative. The distance from the arc to the condenser was 9 in., from the condenser to the front glass of the printing frame 15 in. ; the time of exposure, using an ordinary fish glue formula, was usually from five to ten minutes with all the negatives that were suitable in their range of contrasts for giving a successful result.

It is important to have the film negative and metal plate in good contact, any little kinks in the film are reproduced as fuzzy patches, so familiar to the printer on metal ; too long exposure must also be avoided, as the print when dyed up after developing in the usual manner has a curiously deceptive appearance in

the shadows, and the printer may probably find on burning in his print that the shadows are solid. A gentle rubbing with cotton wool while developing will be found to have a wonderful effect on such a print, the effect of the screen appears to be that of a vignetted irregular grain with the light shading away from the centre of the individual grains, so that if the film negative is too transparent in the shadows these vignetted grains rapidly grow together and form a solid.

A somewhat similar effect is obtained by using a diffused light, such as that given by an enclosed arc without a condenser. The grain under this condition appears to gather into masses and gives a coarse, lumpy effect, which is very destructive to the detail of the negative ; it appears to be necessary to use light rays as nearly parallel as possible and to keep the frame and light in one position or confusion of the screen grain is set up.

The Paynetype process will, of course, furnish a much more rapid printing medium and could be used with an ordinary incandescent lamp in the dark-room, but pressure of work in other directions has prevented me from making more than one or two experiments, which, although very promising in result, are not sufficiently complete to put on record at present.



A Rocky Beach

Photograph by
W. P. Thomson.

Wallage & Gilbett, Ltd.

On the Use of Caseine for Obtaining an Acid Resist in Photo-Mechanical Etching.

By Prof. R. NAMIAS and R. PIOLA.

(Translated by R. BORN)

MONT BLANC.

Photograph by DR. ENGLAND.

T. B. BROWNE, LTD.

AS an acid resist for metal plates used in photo-mechanical etching, Prof. Namias has for some years past suggested the use of caseine in substitution for albumen and fish glue enamel.

Lately, we have made a good many trials with caseine, and as the results appeared to us very interesting, we consider it worth while to give here a short summary.

The caseine solution was made up as follows:—

Ammonia	100 c.c. ($3\frac{1}{2}$ ounces).
Carbonate of potassium	1 gm. (15 grains).
Caseine	15 gm. ($\frac{1}{2}$ ounce).

It is difficult to obtain at once a homogeneous solution, but if we allow the whole to stand for some hours the caseine will dissolve in a perfectly uniform manner.

The caseine also dissolves well in ammonia alone, but we have found that after a few days we get a formation of an insoluble deposit. The addition of a very small quantity of carbonate of potassium, however, greatly retards the formation of such a precipitate.

This solution is made sensitive through the addition of:

A saturated solution of bichromate of ammonia, 100 gr. ($3\frac{1}{2}$ oz.).

The whole is mixed and filtered into a clean bottle which has to be kept well closed.

The zinc, which has been freed from grease with French chalk, ammonia or charcoal, etc., and has been grained in the usual way, is covered with a coating of the above-described sensitive solution just as by the albumen method. The plate is then slightly heated until the coating is evenly dry, and is exposed to the light under the varnished negative if the same has already been stripped and "turned," or under the film applied with petroleum. The time of exposure is about equal to that required by the enamel process.

After copying, the plate is slightly rolled up with lithographic ink by means of rather a hard gelatine roller. For development the plate is immersed in a dish with water and if the exposure has been correct and the plate has been prepared well, the image appears immediately.

The plate is washed with only a slight jet of water without any rubbing with cotton wool, and thus made ready for etching, which is done in the usual way.

The fact of washing the plate without any rubbing is of the highest importance, especially if plates with extremely fine images have to be prepared. Also in copying screened negatives this method ensures the obtaining of perfect results, and a surprising regularity which it is very difficult to get by the albumen process.

It is also to be noted that caseine yields a coating which is highly resistant to the mordants usually applied without the injurious burning-in of the plates required by the enamel process.

Moreover, caseine presents the advantage of having a very low price, much less than that of albumen.

In the solid state it keeps well without any special precautions. But the sensitive solution made up in the above described manner keeps a few days only.

Feluccas at S. Gingolph,
Lake of Geneva.

Harrand & Fuller.

Photograph by
Dr. England.

Collodion Emulsion and Colour Work:

Some Leaves from my Note Book.

By H. O. KLEIN, F.R.P.S.

PASS OF ABERGLASLYN.

GLASGOW PHOTO ENGRAVING CO. Photograph by M. R. BRODIE.

THE following notes chiefly deal with the collodion emulsion process, which is likely to become of much greater importance than could have been anticipated in face of the advance made by panchromatic process dry plates.

At present the spheres of both processes are within well-defined limits. Some firms expected of dry plates more than collodion emulsion could offer, and somewhat disappointed, returned to the old process, which they knew to be cheaper, though more delicate.

Moreover there was sufficient evidence to anticipate the coming of a colour-sensitive collodion emulsion dry plate and of a collodion emulsion, manufactured on entirely new lines, to be sold at a price which would make it possible to successfully compete with the wet-collodion process for black-and-white work. Although not on the market, both are accomplished facts.

NEW SCREEN FOR COLLODION EMULSION.

It is well-known that collodion emulsion requires shorter screen distances than wet collodion, which is due to "irradiation effects." How to make use of this somewhat troublesome phenomena has been ably discussed by Mr. Howard Farmer in his lectures on "Irradiation Processes" some years ago.

To avoid sweating of screen, small diaphragms were requisite and the exposures were unduly prolonged. A series of troubles were directly traceable to long exposures and consequent drying of the emulsion film. The new screen introduced by Levy has a very thin cover glass and allows of very close screen distances and large apertures. If we bear in mind that intensity of illumination cannot be compensated for by prolonged exposure, the great value o the new screen becomes self-evident, and cannot be exaggerated. The tendency of the high-lights closing, due to spreading of light, is successfully overcome by increasing the width of the black lines. It is to Mr. Howard Farmer's credit to have initiated this screen, and to Messrs. Penrose's, who are the agents, to have been instrumental in bringing about its existence.

A USEFUL COLOUR PRESERVATIVE.

Collodion emulsion, when sensitized with iso-cyanin derivatives, is liable to be affected by atmospheric impurities. Sulphuretted hydrogen, carbon

dioxide, sulphur dioxide and nitrous oxides in the dark-room or studio have caused trouble.

A simple remedy has been found, which we can strongly recommend.

After washing the plate, flow three times with the following solution before exposure.

Distilled water	50 oz.
Gum arabic	1¼ ,,
Glycerine	3½ ,,

or

10 lumps of ordinary white sugar dissolved in 1 quart of distilled water may serve as a substitute.

The plates will be found to work perfectly clean and to retain their colour-sensitiveness, even if worked under the most unfavourable conditions

Our Pride and Joy.

T. B. Browne, Ltd. Photograph by Graystone Bird.

Ethyl Violet *versus* Pinacyanol.

The question has been raised whether the very delicate Pinacyanol has proved the ideal red sensitizer for collodion emulsion. We feel inclined to answer in the negative. Pinacyanol sensitized emulsions are liable to completely lose colour-sensitiveness within a few days, and serious disturbance to business routine has been caused by this undesirable property. Ethyl violet sensitized collodion emulsion will keep indefinitely, actually improving with age. The red sensitiveness of the latter is, of course, not as great as that of the former, and a deeper filter must be used. Moreover, this increased exposure may be compensated for by larger lens apertures, which Pinacyanol does not permit. Moreover Ethyl violet 6 B or Ethyl purple as it is commonly called, is a very cheap dye, Pinacyanol very expensive.

The reason why Pinacyanol is unreliable we believe to have traced to minute quantities of vinyl-alcohol $C_2H_4O_2$ present in the solvents used in the preparation of collodion emulsion. A similar difficulty is met with when panchromatizing dry plates with Pinachrome. The distilled water shows in most cases acid reaction and completely discolours the dye bath after a few minutes. The addition of ammonia restores the colour, but seriously impairs the keeping qualities of the plate.

Test for Pure Solvents.

Operators are often called upon to dissolve emulsion pellicle, and it will be necessary for them to test their alcohol and ether.

The alcohol must be 95%, spec. grav. 0·790, and stand the following test :— Prepare a 10% aqu. solution of nitrate of silver, a few drops of which are added to the alcohol in the test tube. Now add ammonia in excess and expose to strong light for some time. If the alcohol remains colourless—and provided the specific gravity is satisfactory — the alcohol is suitable for collodion emulsion making.

The ether is tested by adding a few drops of iodide of potassium solution.

No colouration due to liberated iodine should be noticeable.

We generally found that the absolute alcohol of commerce contains too much water, although called "absolute."

It may be of interest to note that absolute alcohol perfectly anhydrous is very difficult to prepare, but if required can be obtained by treating with the ordinary dehydrating agents, removing the last traces of water with metallic calcium. Such anhydrous alcohol would be, of course, quite useless for our purpose, the 95% alcohol being most suitable.

A Swiss Valley Inn.

Direct Photo Engraving Co.

Photograph by
Dr. England.

Bourne & Co.

Photograph by Ellis & Walery.

Miss Dorothy Graham and Mons. Armand.

F. Skeen & Co.

A Prolific Cocoa Nut Tree.

P. Davis & Sons.

Photograph by A. Allerston

Zebras captured in Zululand.

Dundee Courier.

Photograph by Gale & Polden

87th R.I. Fusiliers returning from Church.

Watford Engraving Co.

Photograph by F. Downer & Sons

Britannia.

Dundee Courier.

Photograph by Reinhold Thiele.

Boy Scouts holding up a Provision Van.

F. Medley Haygarth.

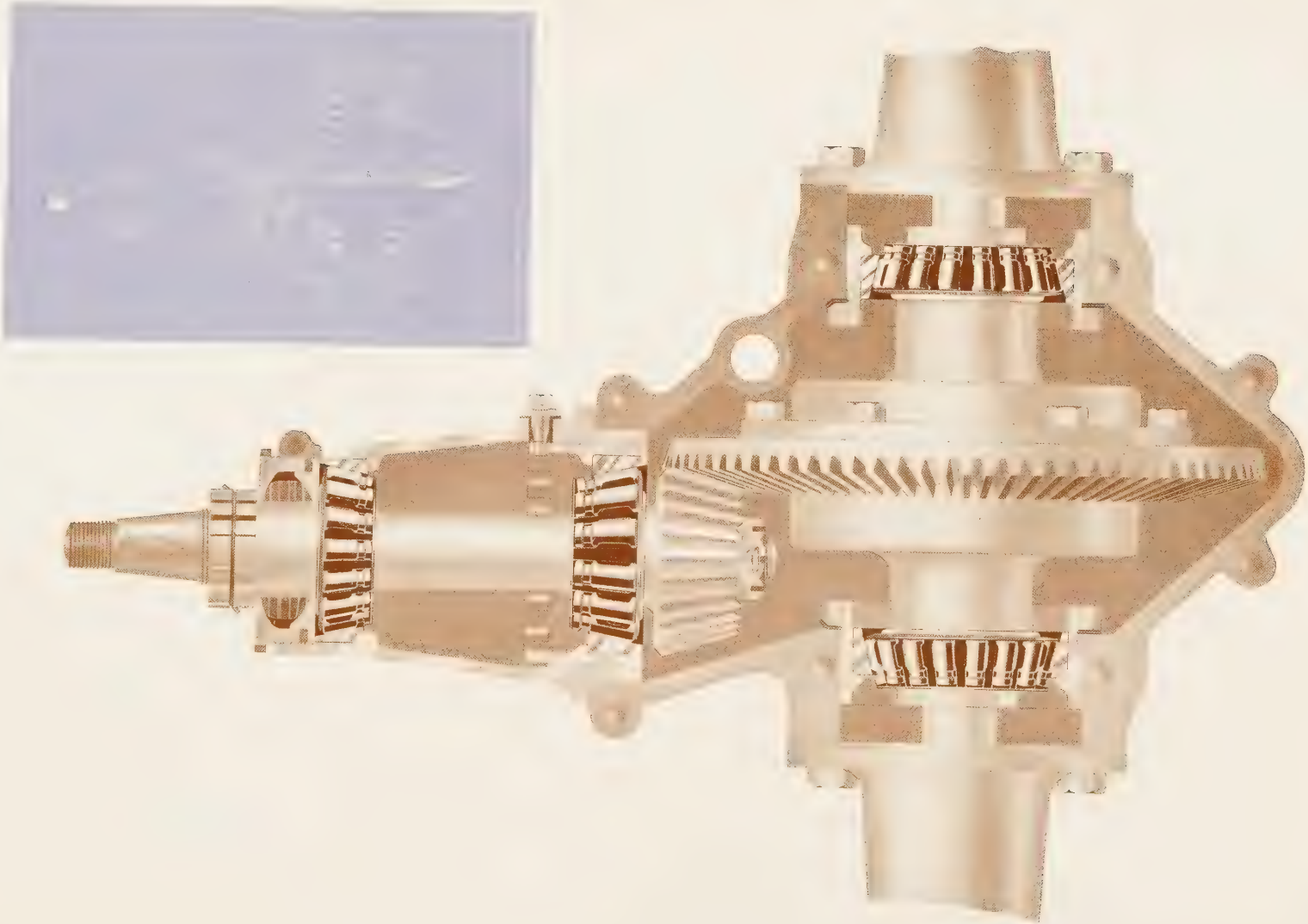
Photograph by G. Stuart Jones.

Native Ricksha Pullers in Durban.

Dean Engraving Co.

Photograph by F. G. O. Stuart.

In the Forest.



V. Siviter Smith & Co.

By courtesy of Electric and Ordnances Accessories Co., Ltd

From Blue Print to Half-Tone.

Showing method of illustrating mechanical detail.

Ichthyol: Its Uses in Photo-Mechanical Work.

By F. DOGILBERT.

FETCHING WATER.

E. HAMEL & Co. Photograph by FRECKLETON & Co.

MANY uses may be found for Ichthyol in photo-mechanical processes. Diluted with an equal quantity (by weight) of water an ink is obtained possessing the same qualities as the lithographic writing ink sold in sticks, that is to say, it imparts to the lithographic stone or to zinc and aluminium the property of attracting greasy ink. Even so small a proportion as 1 per cent. is sufficient to have this effect.

Another interesting fact is the facility with which ichthyol emulsifies in water without formation of bubbles or scum, which are always a hindrance to coating with an emulsion.

Dissolved in a mixture of ether and alcohol ichthyol spread on a plate leaves by evaporation a granular layer similar to the resin grain or bitumen grain. It is possible by modifying the proportions of the ingredients to vary indefinitely the size of this grain, which allows of designs to be made by stopping out with gum. The fixing of the grain is simply done by immersion of the plate in a 2 or 3 per cent. bath of some acid.

It is possible to make a design on autographic paper and, after transferring the same to zinc or stone, to pour over the above graining solution in the same way as in coating a collodion negative. This will give a tint ground to the design.

Ichthyol can be added to collotype emulsions with the object of strengthening the colloid substance modified by the reduced bichromate. In effect the covering of resinous particles would favour the solidity of the image, so to speak, in addition to aiding the solidity of the film. The humidity of the plate would no longer be one of the first things to be considered, in the sense that an excess of water would no longer have any influence upon the inking. The mercuro-chromic emulsions already realize this condition as a matter of fact, and their application to collotype in colours has given the best results. Still the presence of mercury in the film imparts to the gelatine a partial if not total insolubility, which is all the more affected according to its richness in chondrin. Ichthyol supplies this condition to the gelatine.

Another property of ichthyol in collotype would originate from the fact that the sulpho-chromic combination allows of treatment with iron salts which possess in the highest degree the property of attracting greasy inks.

Further, if instead of the microscopic elements of the planographic image one substitutes an image in relief for typographic impressions, it is possible to introduce the electrotyping bath, substituting in the depositing solution iodide of potassium for cyanide if the deposit desired has a base of silver on a sulpho-ferro-chromic image. The structure of the collotype image being the only one besides photogravure which can claim to be used for art work—a claim which could not be put forth for half-tone with a grained screen—it would be largely used if damping of the plates were no longer a necessity, the plates being " metallized " instead, and thus the only factor that would remain would be the inking, which is quite sufficient to look after.

Further, in photo-lithography and photo-typogravure the property of ichthyol can be made use of to form in the film which coats the metal a graduated image in grain, proportionate to the action of the light penetrating a continuous tone negative. These methods would necessitate a thin film of enamel glue, preferably with albumen, which veils rather easily by irradiation.

In carrying out the suggested methods many details have to be considered, and conditions have to be determined, which only experience can teach how to define. Numerous and special matters having occupied me, I have not been able to follow up these ideas sufficiently, but my colleagues in photo-mechanical work will be able to see how the same may possibly be carried out, and no doubt will develop them to their own advantage.

KINE AT WATER.

THE PHOTOCHROM CO.

Photograph by
F. G. O. STUART.

A Step Forward in Photo-Lithography.

By J. WIDDOP.

PLAYMATES.

PHILIPSON, SON & SKILLETER. Photograph by A. L. HITCHIN.

MUCH progress has not been made up to the present in the application of half-tone photo-mechanical methods to lithographic printing.

In stone printing two difficulties confront the printer. (1) The fine white dots in the shadows tend to close up, so that all shadow detail becomes lost, the three-quarter tones becoming solid; (2) The fine black dots in the lightest tones tend to become finer and ultimately disappear. In ordinary chromo-litho printing the former tendency is combated by damping with water containing sour beer, nitric, phosphoric, tartaric and other acids mixed with gum arabic, etc., but in half-tone photo work such methods are inadmissible, as the lighter tones are thereby quickly destroyed. In fact, it is the common experience that when the most skilful printer has attained an equilibrium in the action of these two opposite tendencies by means of adjustments of ink and water, these tendencies still continue to operate at the extremities of the scale; the smallest dots gradually disappear, and the shadows gradually "fill in," so that it is only a question of time before the resulting deterioration necessitates the preparation of another stone.

The increased use of metallic printing surfaces was hailed as affording great advantages over that of stone for half-tone work, on account of the freedom from thickening and spreading which characterizes work on aluminium or zinc compared with stone. However, the necessity of imparting a grain to the surface of the metal, immeasurably coarser than the natural grain of litho stone, which makes retransferring of very fine work a most difficult matter, combined with the superficial character of the drawing or transfer, the liability of metal to corrosion by atmospheric influences, the greater difficulty attending the making of corrections involving hand work, and the impossibility of imparting a slight relief to work on plate, as is so readily accomplished with stone, practically counterbalance the advantages above referred to, so that almost all hope of successful half-tone printing by existing methods of lithography had been abandoned.

Quite recently, however, a simple method of treating litho stone with a certain preparation has been discovered by Mr. W. Learoyd, litho. and process instructor at the City of Bradford School of Art, which enables the very finest work to be successfully reproduced without the slightest tendency to thickening or "filling in." Not only does this preparation impart to litho stone all the advantages of aluminium or zinc, as regards sharpness of transfers and freedom

from "spreading," but it does so in a greatly increased degree, without in any way injuring the finest work or affecting the well-known advantages which stone offers, compared with metal, in regard to latitude in treatment.

The practical lithographer will at once perceive that with a stone so prepared, not only will it be unnecessary to employ etching solutions in damping, but that the deterioration of the lighter tones by the dots becoming "rotten," can be effectually prevented by adding a small proportion of oleic, palmitic or stearic acid to the ink, without danger of causing "scum" on the white parts of the job.

Not only does this preparation make half-tone lithography from stone easy and certain, but it has proved of the greatest value in ordinary litho-printing, its use enabling longer runs to be obtained from stone without the deterioration and delays usually experienced, and resulting in a cleaner appearance of the finished work than it is customary to find in lithographic printing.

Feeding the Ducks in Kew Gardens.

Arc Engraving Co.

Photograph by
Kuno Reitz.

The Tone Photo Engraving Co.

Inks by Parsons, Fletcher & Co., Ltd

"Sir Andrew Aguecheek."

(In Shakespeare's "Twelfth Night.")

From Water-Colour by "Warren."

Pseudoscopic Appearance of the Dots on a Process Plate when Viewed in a Microscope.

By REGINALD S. CLAY, D.Sc.

NIGHT.

HILL & CO. Photograph by GOULTON MAY.

IT is the frequent experience of process workers that the raised dots on a process plate, when the latter is examined by the microscope to see how the etching has progressed, appear as pits instead of as elevations on the plate, and (especially to a beginner) the appearance is very confusing in consequence. The illusion is due to the combined effect of the illumination of the dots and the inversion produced by the microscope.

In the estimation of distance and of relief we are accustomed to make use of very different aids. In the open country, for instance, we largely judge of the distance of objects by the *indistinctness* of outline produced by the atmosphere—a quality which photographers are always pleased to obtain in their pictures. Everyone knows how deceptive distance may become in an exceptionally clear atmosphere. To some extent one judges of the distance by the size; thus many people will say that an object seen through a concave lens seems a long way off, though as a matter of fact the image is really nearer than the object. To some extent one judges by the number of things intervening between the object and observer. Hence one thinks the sun further off when near the horizon than when higher in the sky, and this is why one says it seems larger. The distance of near objects is largely estimated by parallax, and stereoscopic relief is almost entirely produced by this means. One is thus able to produce stereoscopic pictures by taking two views of a landscape containing objects at different distances, the camera being moved a short distance sideways between the two exposures. But in a case of very low relief, *e.g.*, the surface of a medallion, there is not sufficient difference in the images formed by the two eyes on their respective retinas to produce stereoscopic relief (especially if the surface has no abrupt changes of level, but is only smoothly rounded), and in this case we rely upon the way the *shadow* falls, having learnt by experience that with the light coming from above relief is associated with a certain distribution of light and shade. That this is the cause of the appearance of relief is proved by the fact that a photograph of a piece of sculpture in low relief, which reproduces this distribution of light, often produces so strong an illusion of relief, that it is difficult to believe that the photograph is not embossed.

It follows that if on some occasion the distribution of light is altered, and, whilst the observer still imagines the object lighted as usual from above, it is really lighted from below, or if the photograph has been inverted, an object in low relief may appear in intaglio. This effect has frequently been drawn attention to, and many curious photographs have been printed from time to time illustrating it. Two enlargements of process dots, figs. 1 and 2, have been kindly prepared by Mr. Gamble and are here reproduced. To obtain the full force of the illusion, look at the illustrations while you are facing a window, so that the light from the window falls on them from above. The blocks are identical, but one has been turned upside down; to most people the dots appear in relief in the one, and in intaglio in the other.

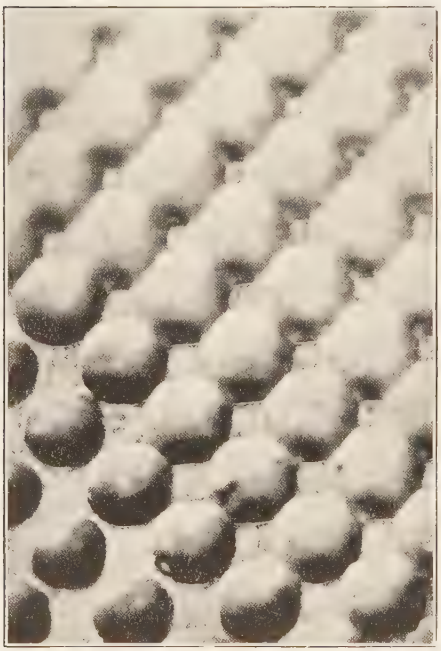


Fig. 1.

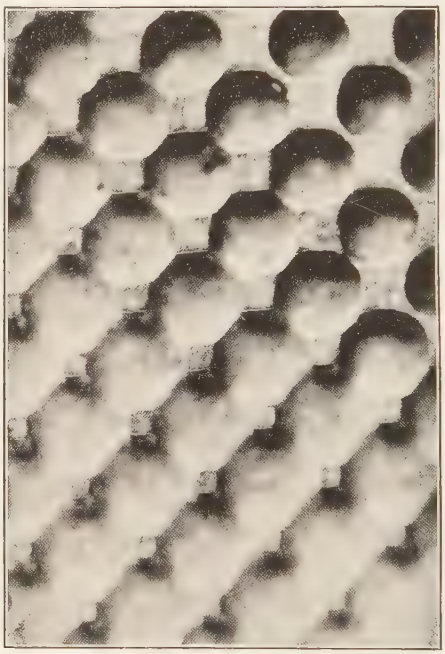


Fig. 2.

Now, in the case of the process plate, the observer knows how the light is falling upon it; he therefore knows how the light and shade should be distributed, and which side of a dot should appear light, and which side be in the shadow. But if he observes the plate with an ordinary compound microscope, the image formed by the microscope is inverted, and thus he is entirely misled; if, for instance, the light is in front of him, the front of the little cone forming a dot should be bright and the back dark, but owing to the inversion produced by the microscope he sees the front of the cone dark and the back bright. This is, of course, the appearance which would correspond to a hollow cone with the light in front, and thus a strong illusion is produced. In a diffused daylight the shadows are only faintly marked, and his knowledge of the real shape is sufficient to counteract the illusion.

Two ways suggest themselves of reproducing the true stereoscopic relief—either to reverse the direction in which the light shall fall upon the plate, or to produce an *erect* image. The first may be done by cutting off the direct light and lighting the plate by means of a small mirror or opal close to the objective of the microscope; this would light up the back of the cone itself, and therefore the front of the image formed by the microscope. The second may be done by

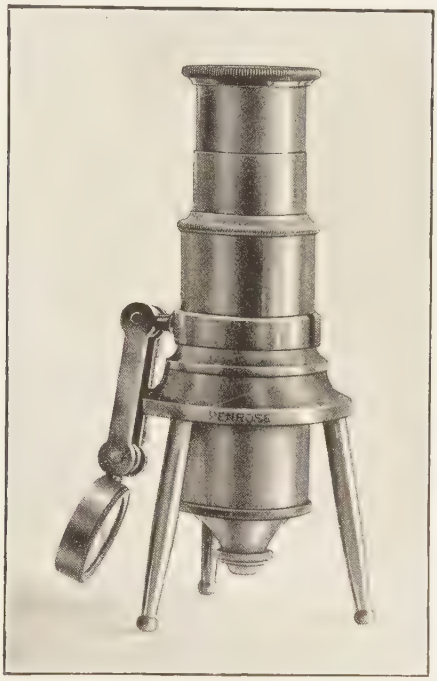


Fig. 3.

adding lenses to the microscope to produce an erect image, as in the terrestrial telescope. The former is very easy, but it requires some little care in adjusting, which, perhaps, one can hardly expect of the ordinary etcher; thus the latter is probably the more practical method. A photograph of a microscope with a mirror attachment to reverse the lighting, made by Messrs. Penrose & Co., is reproduced in fig. 3.

Filterless Three-Colour Reproductions — Half-Tone Painting.

By N. S. AMSTUTZ (Valparaiso, Ind.).

THE OLD FISHERMAN.

Photograph by "WESTERN MAIL," LTD. ROBERT BRAID.

IT has come to be looked upon as an almost absolute necessity to use filters or screens for the production of three-colour prints. At any event those outside of the craft most usually occupy this attitude. Those who comprise the craft, of course, know better. Many so-called "fake" colour jobs are really works of art, notwithstanding the fact that no filters at all were used in their production.

Ben Day shading medium films have also been used as a basis for colour reproductions without recourse to filters.

The control factor is quite large, but of course its execution is almost entirely dependent on the skill of the Ben Day man or the colour etcher. There is no doubt that there are large possibilities in the direction of half-tone "Painting" that have not yet been pre-empted.

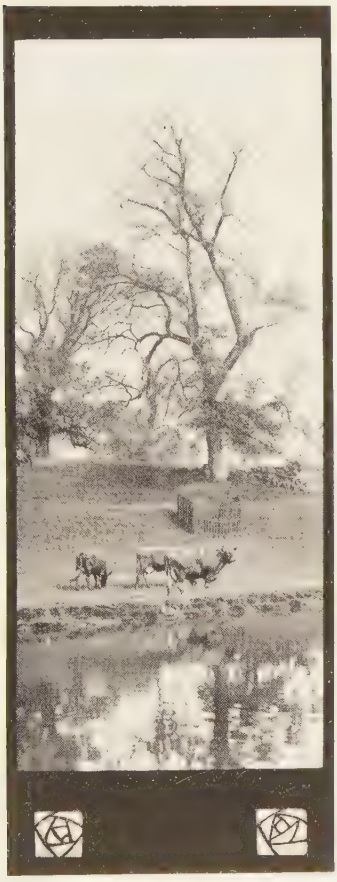
In a general sense it may be said that the peculiar skill required by expert half-tone craftsmen is of a relatively secondary order to that of the originating colour etcher. A consideration of the special qualifications that are required to successfully execute this class of work is both profitable and extremely interesting.

The artist who mixes his pigments with "Brains" and most deftly applies them in proper balance to his canvas, and through his marvellous colour instinct produces a masterpiece—an inspiration to all observers thereafter—deals with a large number of various coloured pigments, from a dozen to a score, to produce his shades, tints and hues, while the half-tone "Painter" has only three or four "colours" to serve as a translating medium. The brush artist keeps adding on colours over each other, modifying the effects according to his artistic discernment, but the half-tone painter constantly reduces his colour values in the direction of tints by the admixture of white. This white is, however, pigmentless in the sense of a physical application. His three separate plates, untouched, would print black and it is through the use of a white paper flash exposure that the small shadow dots, which may be likened to the texture of the canvas of the oil painting artist, are formed and on which the subsequent steps of the chemical painting depend. A suitable outline of the subject may be placed on the copy board and just enough exposure given to define the same on three separate negatives with lines at the usual 120 degrees apart, thus forming three separate "key plates" for the artist to follow. If the fish glue print on the copper was stained a process blue the colour would contrast with a red carbon transfer colour used as a medium to

V. Siviter Smith & Co.

In the Cotton Fields.

record the outline of an original traced successively on to the three separate plates. The edges of the outline sketch should register with the margins of the plates so as to make it easy to subsequently confirm the contour of any given portion of the outline during the etching-" painting "-stages. For greater facility in making comparisons, transparent celluloid about 0·005 in. thick will serve splendidly for the most delicate outline copy of the original design.



THE RIVERSIDE.

UNIVERSAL PROCESS ENGRAVING CO., LTD. Photograph by T. FALL.

It can be made with a steel needle suitably ground so as to present a number of facets which serve to trace delicate grooves into the upper face of the sheet. Soft lithographic or oil crayon of a colour that will contrast with the copper plate enamel may be rubbed in. This form of a key sheet will be found of incalculable value.

Register marks may be made on the original sketch and transferred to the celluloid key sheet as well as to each of the three plates, thus making possible the most accurate comparisons while the " painting " is in progress.

The half-tone painter deals with three colours only, executing each one independently of the other and yet dependent on each other. In order not to carry his colour dilution too far, it will be found best to " make haste slowly," that is, allow the colour values to remain underdone until the first consecutive and composite proofs are pulled. Thereafter the values can be brightened up by easy stages as much as required.

It is, of course, understood that only the exceptionally artistic craftsmen would be attracted by this method of " painting," and it must be emphasized that such creations are as truly artistic as any other kind of accepted production produced with brush or etching needle or roulette. In fact, it has a distinct advantage in that after the work is completed, limited editions with artist's remarque thereon can be printed, which in effect will be indicative of the creative skill of the artist to the same extent as dry point or etched copper-plate productions, and they have the advantage of a colour medium in the printing. In fact, there would be nothing to prevent the etcher from pulling his own proofs as his work proceeds, and finally to print a limited edition with his own hands, thus exemplifying his skill in many duplicates. Not being an expert printer the proofs will likely have more or less individuality, in that they will not all be exact mechanical or photographic duplicates.

In commercial parlance faked colour jobs are not looked upon with much tolerance by the man who swears by cut-outs and flat etches. On the other hand, how many jobs can be carried through automatically without the etcher's assistance, in staging or fine etching the plates ? Very few indeed. Then why circumscribe the artistic inclinations of those etchers who are skilled enough to

"pull a plate into shape" by using an offensive designation to identify their work. Since it is commonly understood that compensations are needed to correct the shortcomings of the filter and ink relations, why place such compensatory skill in the category of *faking* when in straight black and white work the same kind of procedure is dignified by the title of re-etching, staging or fine etching. There are more fundamental reasons to avoid making apologies for *compensating* filter shortcomings in colour etching, than in doing the same thing to remove negative deficiencies in black and white work.

These ideas are not advanced as a novelty, for monochrome and colour workers in Europe and America have practised this kind of a procedure for a long time past in general commercial work. What is intended is to point out the possibility of a new line of real art effort, serving a separate field from the popular three and four-colour half-tone reproductions. Copper-plate painting is done regularly by photogravure workers, in which separate colours are laid on to proper areas of a photogravure plate and single impressions made therefrom.

The author does not see why a limited number of colour etchers could not bring into being a new art, and for want of a better name call it Half-tone Painting, thus immortalizing themselves and exemplifying the great flexibility and adaptability of the half-tone process.

It would be immaterial as to whether the screen "grain" was regular or irregular for relief or intaglio work, as the use of three or four plates thus prepared and worked up by the artist would constitute half-tone painting.

SUNDAY REST.

"WESTERN MAIL," LTD.

Photograph by
F. A. WILLIAMS.

The Genesis of Printing.

By C. HARGREAVES.

INITIAL DESIGN.

Design and Block by Students of the L.C.C. SCHOOL OF PHOTO-ENGRAVING.

AMONG the many private and public collections of manuscripts and early printed books, one of the most important is that of the John Rylands Library at Manchester, and by courtesy of Mr. Guppy, its librarian, we give a few reproductions of some of its treasures.

Apart from the historical value which such specimens have to a collector, they are full of interest to the present-day printer as examples of the early efforts of his predecessors.

The production of manuscripts was confined almost exclusively to the monastic houses, and was necessarily a slow, laborious and expensive process. These manuscripts were on vellum and were richly ornamented with illuminated initials and capitals. It was only people of distinction that could afford them, and they were bought and treasured as luxuries.

Some readier means was required to supply the wants of the lay "clerks" who were being educated at the colleges and universities, when these latter began to displace the monasteries as educational centres.

The earliest attempts in Europe in the mechanical production on paper of illustrations and lettering were single sheets of a religious character. Very few of these early prints have survived, and although they were being produced in the 14th century the earliest known block print still in existence with an unquestionable date is the St. Christopher, which was produced in 1423.

This print is a representation of St. Christopher carrying the infant Saviour across the sea, and was discovered in 1769 in the library of the Carthusian Monastery at Buxheim, pasted inside the binding of a manuscript.

Following the single-leaf prints were the block books which are the forerunners of the books from movable types. Each page of these books was printed from a single block carved in wood and generally consisted only of pictorial matter; if any lettering was included it was also carved on the block.

The leaves were printed on one side only. The block being first covered with thin ink, the paper was damped and laid on the block, the impression being obtained by rubbing the back of the paper with some kind of a dabber. In some block books the leaves have been found pasted back to back so as to give the appearance of an ordinary book printed on both sides of the leaf. These block books continued to be made during the 15th century; the majority seem to have been produced between 1470 and 1480.

As nowadays the printer reproduces the work of the artist, so the engraver of the wood blocks took the illuminator for a guide and copied his work.

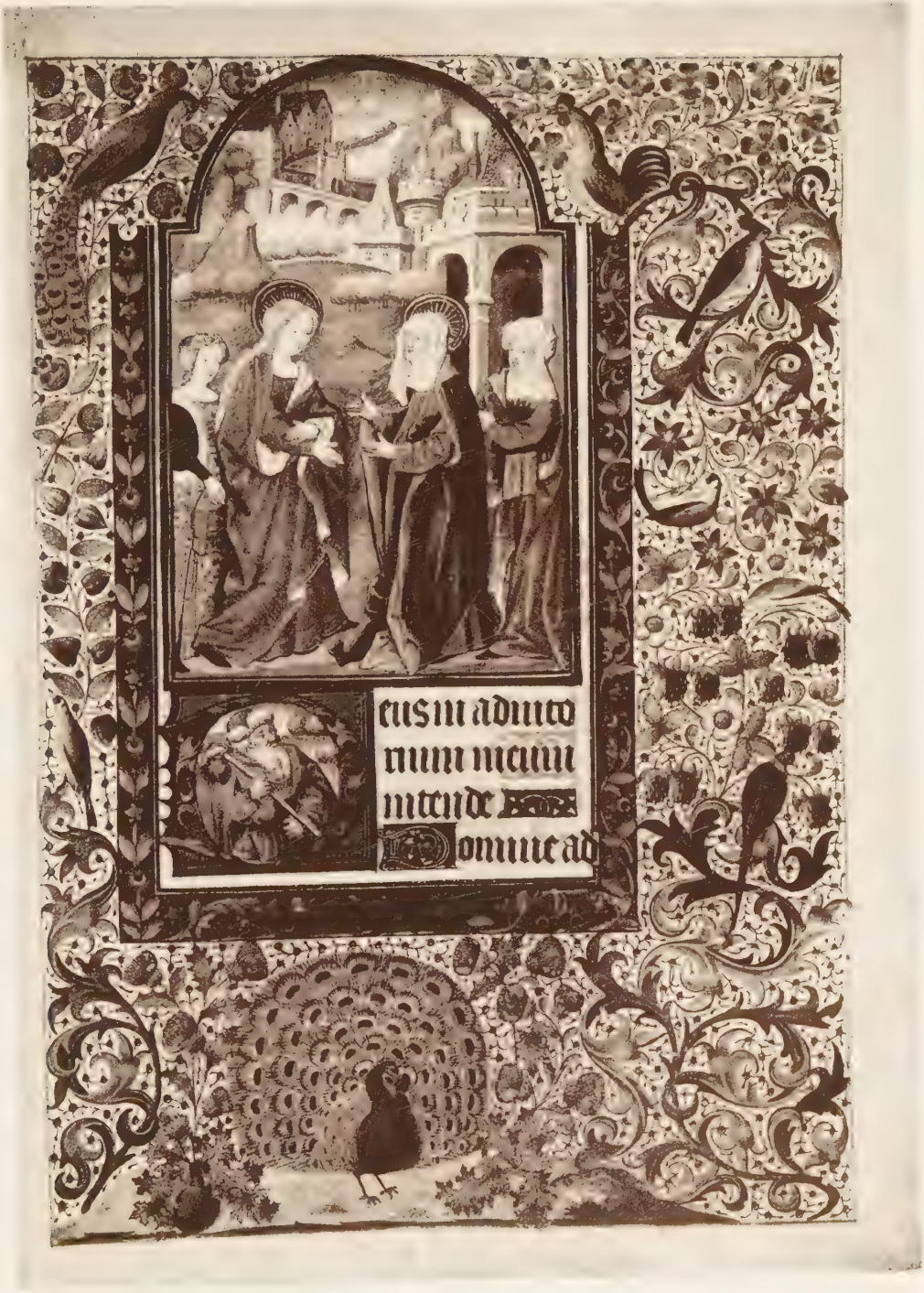
It is interesting to compare the two illustrations showing a page from a manuscript copy of the "Apocalypse of St. John," executed about 1350, and the same page from a block-printed edition produced a century later.

These block books formed a distinct period between the manuscripts and the time when movable type first made its appearance. There are at present only about 100 known copies in existence. One of the most valuable of these is the "Biblia Pauperum" or Poor Man's Bible. Exactly where and when this was produced is not known, but it was probably in Germany about the year 1450. This book contains forty small folio leaves, each one containing three scriptural subjects as a central design. Above and below are half-length figures of holy men, on either side of which is descriptive lettering, with further lettering in the scrolls. This "Poor Man's Bible" must have been an expensive possession, as it was only so-called in comparison with a manuscript copy which was worth about £100, a tremendous sum in those days, representing to-day about £1200.

The original photographs and blocks of these illustrations have been made by Messrs. Entwistle, Thorpe & Co., 42, Deansgate, Manchester.

DESIGN FOR TAILPIECE.

Design and Block by Students of the
L.C.C. SCHOOL OF PHOTO-ENGRAVING.



Photograph and Block by Entwistle, Thorpe & Co

Page from a Manuscript "Book of Hours," in Latin, executed for Charles VII. of France, about A.D. 1430.

Photograph and Block by Entwistle, Thorpe & Co.

The Block-Print "St. Christopher": the earliest known piece of printing to which a date is attached, (1423).

Photograph and Block by Entwistle, Thorpe & Co

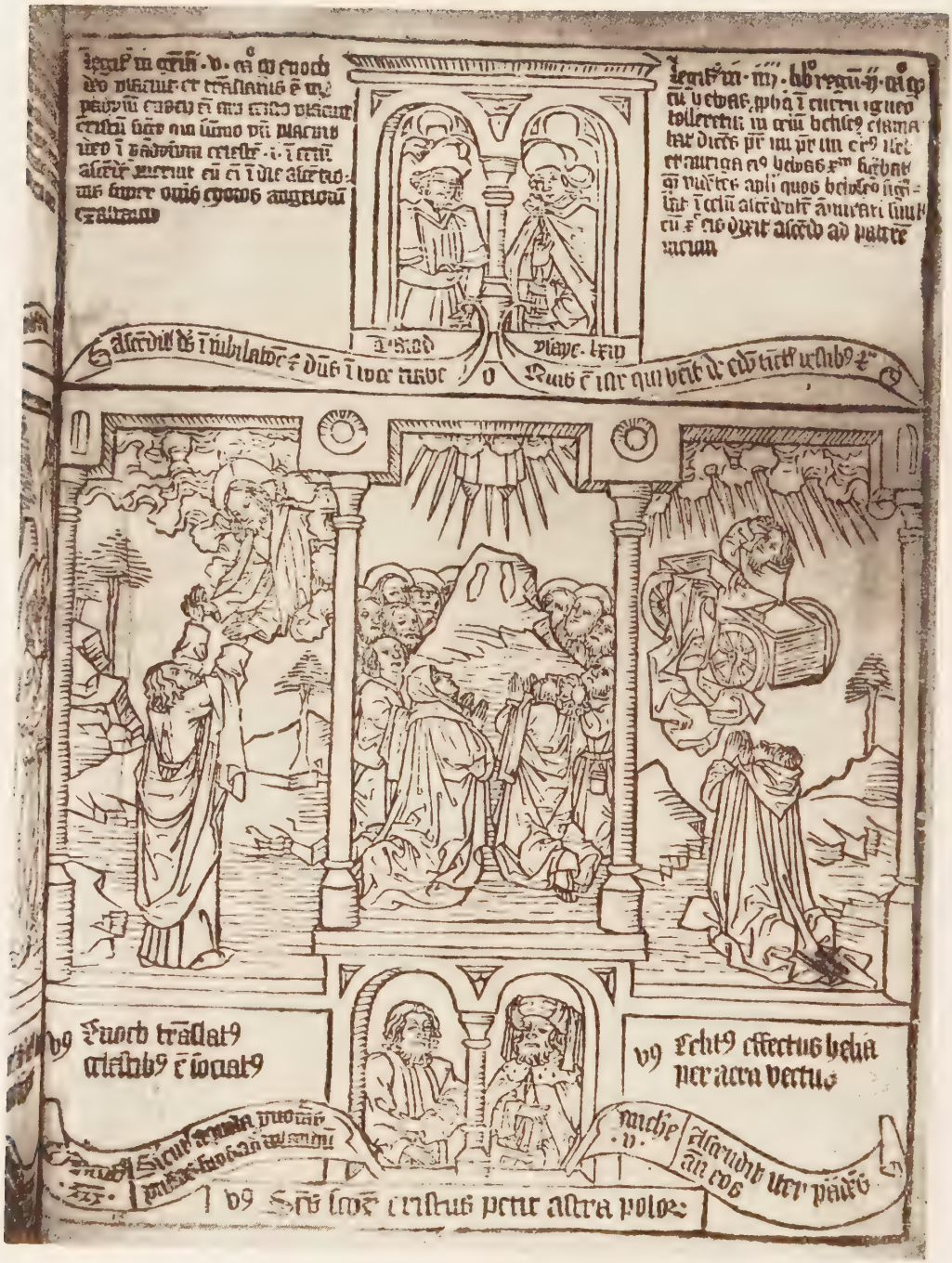
"Noah's Ark" from a Manuscript "Commentary of St. Beatus on the Apocalypse," in Latin, executed in the North of Spain, about A.D. 1150.

Photograph and Block by Entwistle, Thorpe & Co.

Page from a Manuscript Copy of the "Apocalypse of St. John," executed in Flanders, about A.D. 1350.

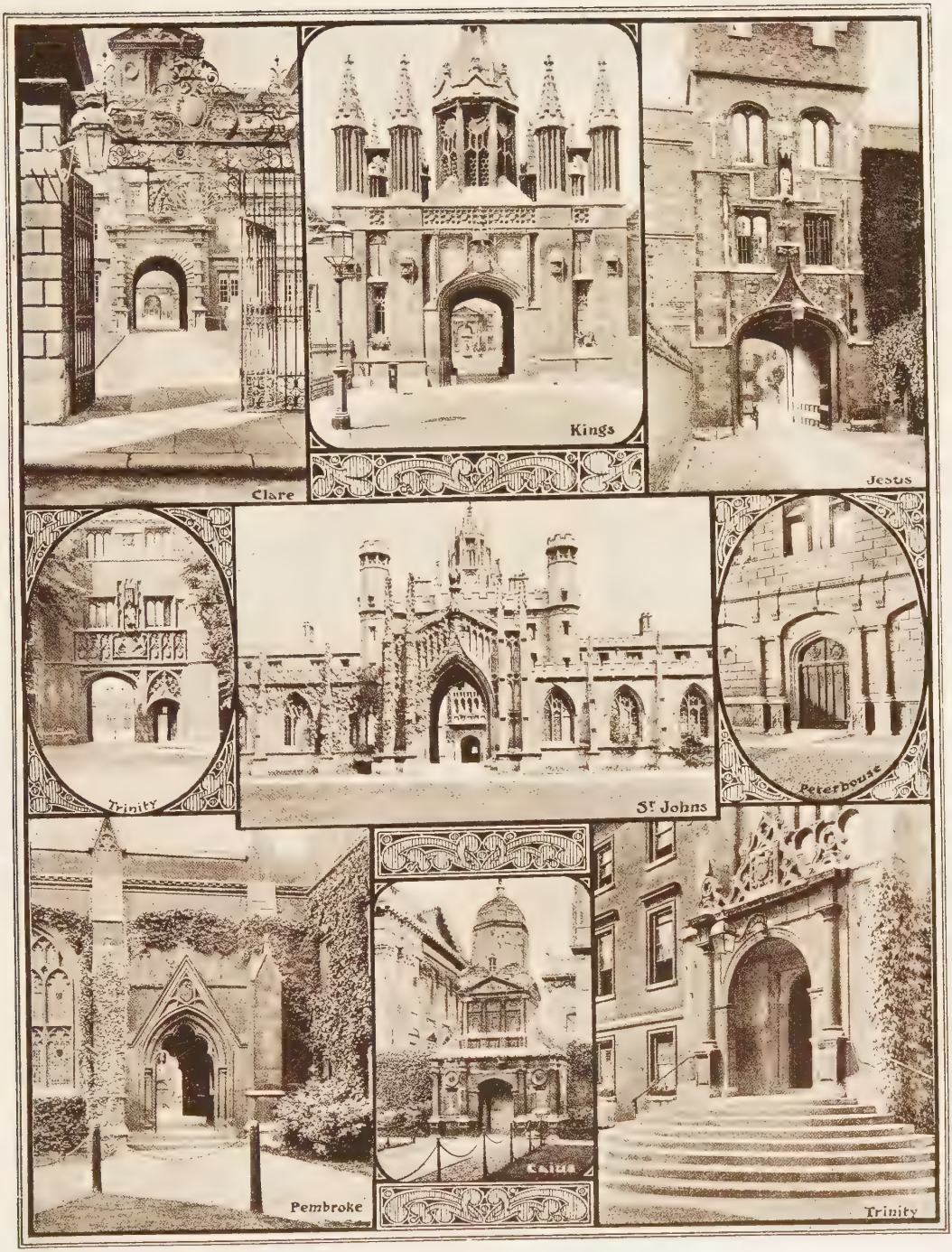
Photograph and Block by Entwistle, Thorpe & Co.

Page from a Block-Printed Edition of the "Apocalypse of St. John," executed in Germany, about A.D. 1450.



Photograph and Block by Entwistle, Thorpe & Co.

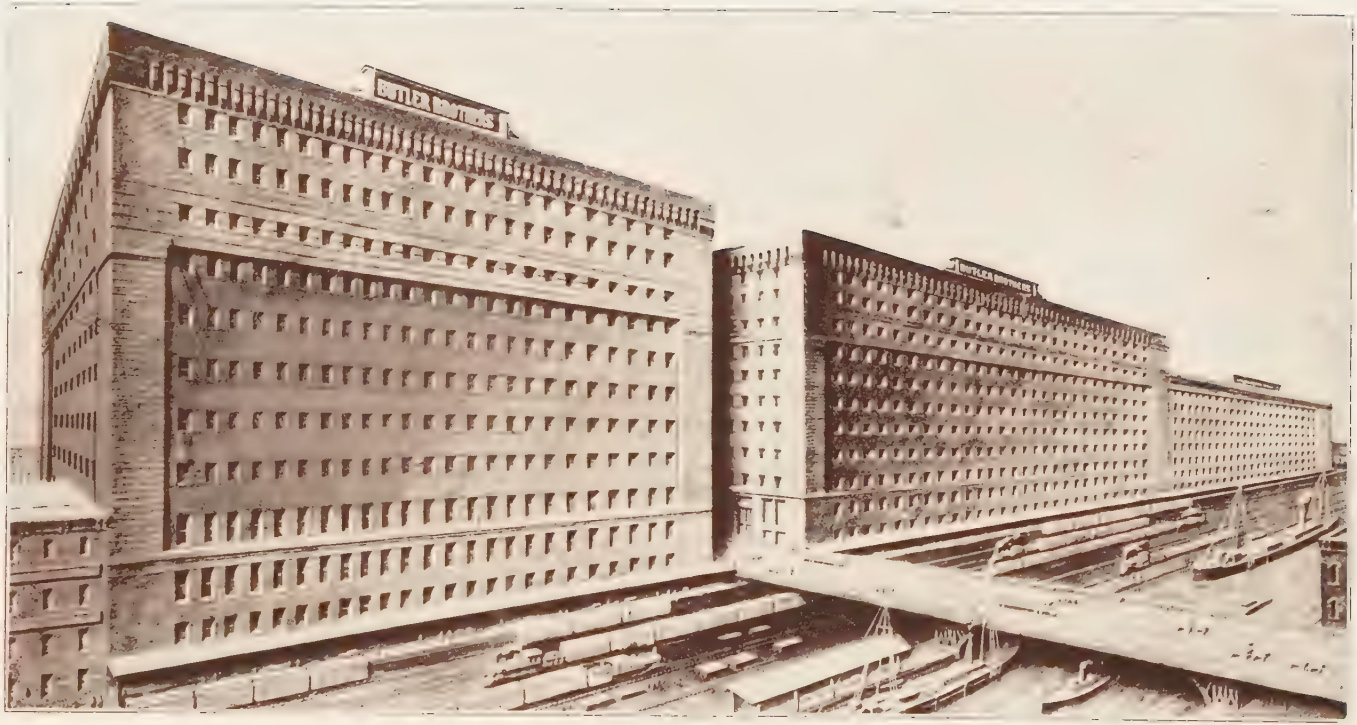
Page from a Block-Printed Edition of the "Biblia Pauperum," executed in Germany about A.D. 1450.



H. Rheinlander & Co.

Photographs by E. W. Jackson.

Some Beautiful Gateways at Cambridge.



C. P. Zacher & Co.

Reproduced from a Clay Model.

Chicago Warehouses.

Design for an Address Card,
by G. ONKELINX,
Brussels.

Arc Engraving Co., Ltd.

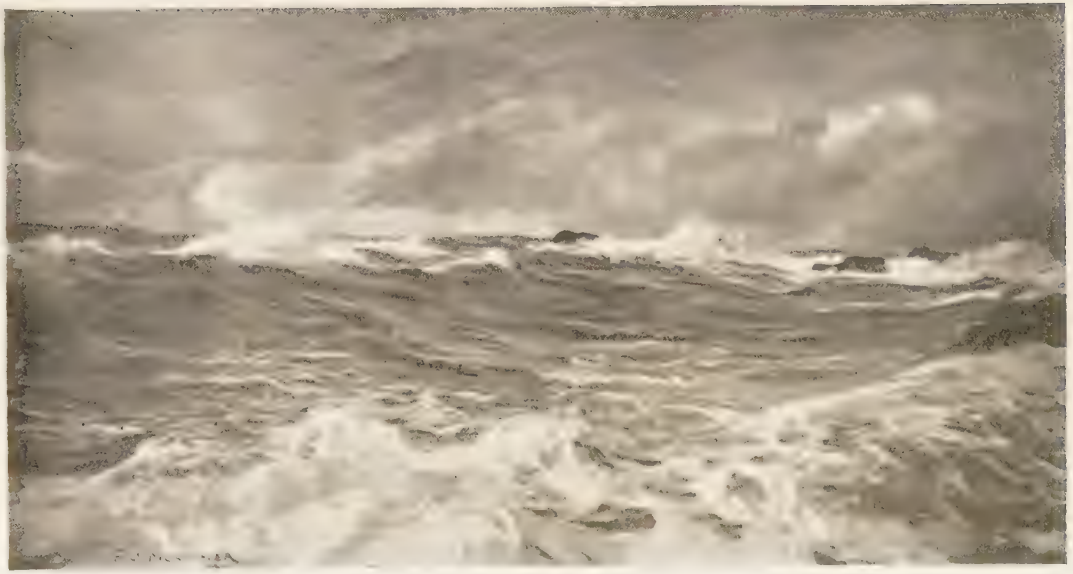
Photograph by F. J. Mortimer, F.R.P.S.

Early Morning off Cowes.

Carl Hentschel, Ltd.

Photograph by F. J. Mortimer, F.R.P.S.

In the Height of the Storm.



Carl Hentschel, Ltd.

The Top of the Tide.

Photograph by F. J. Mortimer, F.R.P.S.

Carl Hentschel, Ltd.

Photograph by F. J. Mortimer, F.R.P.S.

The Spirit of the Storm.

Carl Hentschel, Ltd.

Photograph by F. J. Mortimer, F.R.P.S.

Mid Ocean.

Arc Engraving Co., Ltd.

Photograph by F. J. Mortimer, F.R.P.S.

Si vis pacem para Bellum.

Photographing the Waves.

Marine Photography, with special reference to the work of F. J. Mortimer, F.R.P.S.

By CHAS. E. DAWSON.

PHOTOGRAPHING THE WAVES.

MARSHALL ENGRAVING CO.

THERE is always something happening to remind us amid our work-a-day life that we are a maritime nation.

From the launch of the latest liner to the most recent newspaper-made war scare, it is brought home to us that we are an island race, that we own more than one-fifth of the earth's surface, and that from time immemorial we have gone down to the sea in ships.

It is, therefore, not surprising that pictures of the vasty deep hold a never-ending appeal for us.

In our colour supplements and on our walls, little girls with doggies may come, and young ladies in party frocks may go, but the sea picture is always the stand-by of the Art Editor. Not only have we inherited by legend and literary romance our love for the ocean, but our happiest days and holidays have as often as not been spent by the sea under the glamour and fascination of the waves.

Furthermore, there is a growing number of men who, tiring of the limitations and expense of motoring, seek the solace and invigoration of the sea in yachts and other small craft. These men are the best patrons and keenest critics of the marine artist.

The sea as a subject is more popular than ever. Painters like Charles Dixon, R.I., are doing better work than any previous generation knew, because the speed and exactitude of modern photography has revealed for them many of the wave problems that the human eye, unaided, can only guess at.

It is good to record that the most intimate, daring and entirely successful photographs of the sea in her many moods are done by Englishmen.

One of the most prominent marine photographers is F. J. Mortimer, whose pictures have received almost universal acknowledgment and awards in nearly every important exhibition. One need only compare his work with the photographs that were done before he began to specialize on the subject to understand why such widespread appreciation has been bestowed upon him. Mortimer, although he edits one of the most virile and interesting photographic journals in the world, and contributes lively articles on photography to the leading newspapers, is so passionately absorbed in the making of seascapes, that he will not

for an instant manipulate a print with a view to reproduction. In this respect he will get little sympathy from the process man, and considering how unsuitable some of his pictures are for the half-tone process, the accompanying illustrations speak volumes for the skill of the engravers. In these circumstances I must ask the reader to take my word for the exquisite qualities of the originals. They exhibit a wonderful range of tone values, from the almost blinding whiteness of foam to the dense brown-green of the wave shadows. In addition to their breadth and grandeur, these pictures have a very practical value for painters, in that they clearly reveal the forms of waves, rollers and breakers, and leave permanent record of their movements in well-defined shapes and tones.

The Wave in the Making.

In many of his prints, the wave in the making can be studied as easily as if it were a section of geological stratæ or a contour relief map.

In his youth Mr. Mortimer, like many of us, just " dabbled in photography."

As a boy, he lived in Portsea, within the Portsmouth harbour mouth. Round and about Britain's naval base, his young imagination was fired by the salt spray and many famous old ships, and the talk of the old seadogs who manned them.

Here it was that the keel was laid, so to speak, of his life work and his love for the ocean and all its ways.

His Wander-years were spent along the bleak and stormy coasts of Cornwall and the Scilly Isles.

For three years, young Mortimer lived a sea-girt existence on the islands—those tiny dots on the map, but vast, dramatic and far more terrible in the fury of the storm than any " Brocken " scene.

The full unbroken sweep of the Atlantic battering the rocks of these little islands, and the waves breaking high up against the cliffs, have yielded him the most remarkable and thrilling series of pictures ever recorded by the camera.

Towards the end of each year, at about the time this annual is published, when we make for the fireside and, weary of the Christmas numbers, listen to the raging winds outside, Mortimer packs his bag and his camera and hies him back to his early hunting ground.

I cannot estimate off-hand just how much I should want to bribe me to make his mid-winter journey; for in spite of the comforts of modern steamers, the physical misery of one crossing would, I imagine, be enough for the average man.

But Art always demands her sacrifices, though Mortimer looks forward to his annual pilgrimage with the zest of a schoolboy going for his first holiday.

Visiting the islands year after year, Mortimer has become a *persona grata* with the rugged islanders, who welcome his coming as they do the flowers that bloom in the spring.

For despite the noisy ravage of the winter storm, the spring opens early in these little places amid the gulf stream, and sheltered by miles of high walls, the bulb bloom is grown that goes to make Covent Garden fragrant at Christmas.

More Dangerous than Aviation.

Mortimer will scarcely admit it, but I know it to be true, that he has to take more risks than an aviator when he goes to make such pictures as his " Onrush of a Mighty Sea " or " The Spirit of the Storm." For some of his best " spray " and " spume " pictures he has to get right in the thick of it, and stand not merely " too near to be pleasant," but even " too near to be safe."

The immensity of these rollers and the huge wall of water behind them—advancing relentless and irresistible—has a peculiar fascination for Mortimer.

But from long experience he knows them so well, he is able to classify them, understand their antics and little ways, and almost to anticipate their movements. Few boats could live where many of these pictures are taken. The raging, tearing tumult of the sea battering the rocks is nearly deafening, and the masses of water hurled through the air with enormous power test the nerve of the most seaworthy man. Even the coastguards are shy of going all the way with him when he is prospecting for a new "pitch."

For to stand a second too long in front of an incoming wave about to curl over and crash its thousands of tons weight on the rocks, is to court an instantaneous finale.

For his work, Mortimer has evolved a special outfit, a plain work-a-day camera in a wooden waterproof box, without any external trimmings or complications other than the leather strap. A tripod, of course, is out of the question, and there is rarely time to use ground glass or the ordinary view finder. But he has fashioned one that is merely a rectangle of wire, divided by cross wires into four squares. It can be drawn up in position or slid away into grooves down the front of the camera. The wire view finder is the same size as the film, and it has the merit of irreducible simplicity and efficiency. The wires also show if the camera is not quite vertical, an important condition when photographing ironclads, etc.

Outward Bound.

Photograph by "Western Mail," Ltd. West & Son.

How Mortimer Works.

Mortimer goes down to battle with the waves clad in a very picturesque looking suit of oilers over two suits of Jaeger pyjamas. On his boots are fixed "Alpine" studs, to keep a foothold on seaweed and slime-covered rocks.

It is rarely that he takes a photograph of a real big wave without paying for it in the shape of a drenching, to say nothing of the bruises caused by buffeting against boulders. Remote bits of rock jutting out in the very track of the rollers offer tempting vantage ground, and by dint of an hour's or so crawling and jumping and looking out for his chance, Mortimer can reach one. There he will sit watching for the ideal grouping, the arrangement of light and shade that will make a good pictorial composition. At any moment an unexpected and sportive wave may detach itself from its place in the procession with the sole apparent object of flicking the venturesome photographer off his perch with a few hundred tons of

water. As a safeguard, he uses a life line, to which he is attached by a waist belt, the other end being held by two trusty longshoremen.

Even with this precaution, his predicament, when hit by a playful roller, is too exciting to become a popular pastime, and jagged rocks are not the jolliest things to be bounced upon. It needs, however, something more than personal courage to take first-hand pictures such as these. There is more in the game than even the possession of a splendid physique.

To mark down your wave while she is still frolicking out in the open, to watch her gather up her skirts and come rolling along towards you, to give a sharp bite to the bulb held between the teeth, just at the right moment, when the wave is looking her proudest and best, requires a quick eye and an alert brain. Not every good snapshot makes a picture, in fact very few of them do, but Mortimer's work is more than mere snapshotting, for he not only reproduces with wonderful realism the moods of the sea, but each of his photographs conforms more or less to the well-ordered laws of pictorial composition.

The Sea in the "Grand Manner."

Mortimer delights in rendering the ocean in its more dramatic moments, in its "grand manner," and despite the poetic serenity of some of his quiet evening effects, there is always the feeling that the sea is never quite asleep, that at any moment it may wake up and be noisy.

The landlubber, who only takes a platonic interest in the sea, can learn much from the study of these pictures. Here are shown, as only the camera with an artist behind it can show, the regular movements of the waters far out at sea. They differ as much from the mannerisms of the choppy waves around the breakwater as breakers against the rocks differ from the beach waves on the foreshore.

Many of Mr. Mortimer's pictures are done in his favourite Bromoil process, about which he and many other artists are so enthusiastic, but above and beyond all manipulative methods and dark-room devices, there stands the undisputed fact that we have among us a new personality in pictorial photography, and a man who knows his work.

Photographing the Waves.

A. Cox Illustrating Co., Ltd.

A One-Colour

(Litho)

Floral Design on Fabric.

Haves, Reynolds & Co.

PHOTOGRAPHING THE WAVES.

A. COX ILLUSTRATING CO., LTD.

The Latest Mechanical Conquest of the Graphic Arts and Crafts.

Perpetual Multi-Colour Printing Process in Lithography.

By JOSEPH GOODMAN, Technical Teacher, Liverpool Municipal Technical School.

PORTRAIT STUDY.

DIRECT PHOTO ENGRAVING CO., LTD. Photograph by E. E. HINDLEY.

THE advent of anything new and revolutionary in a craft, at once calls forth to one's mind, the comparative relationship of preceding methods; coupled with the possible amount of displacement of existing vested and other interests, which prevail at the time of its introduction.

This present particular development in lithography, which it is our pleasure to here chronicle, comes all the more welcome just now, as so many alarmist prophecies have been freely made during recent years, by the advocates and adherents of other printing processes, of what they were pleased to imagine were ominous signs of decadence having set in, in this substantial old art craft, of "Chromo-lithography."

For a number of years "tri-colour typography" has made gigantic efforts to oust lithography from its prominently established domain, as the premier artistic colour printing process of printerdom.

Not only was highly delicate and expensive machinery ushered into its aid, but the photo-process engraver was eagerly encouraged to improve the drawbacks of his part of the work as well.

The "typographic" journals never wearied in publishing most glowing accounts of the successful way in which their craft was fast assimilating these new illustrative, pictorial methods of printing, to the great detriment of lithography.

So that almost everybody outside the craft (and it may be conceded also some few within it) were beginning to harbour gloomy thoughts about the future of this century-old planographic, chemical printing craft of Senefelder.

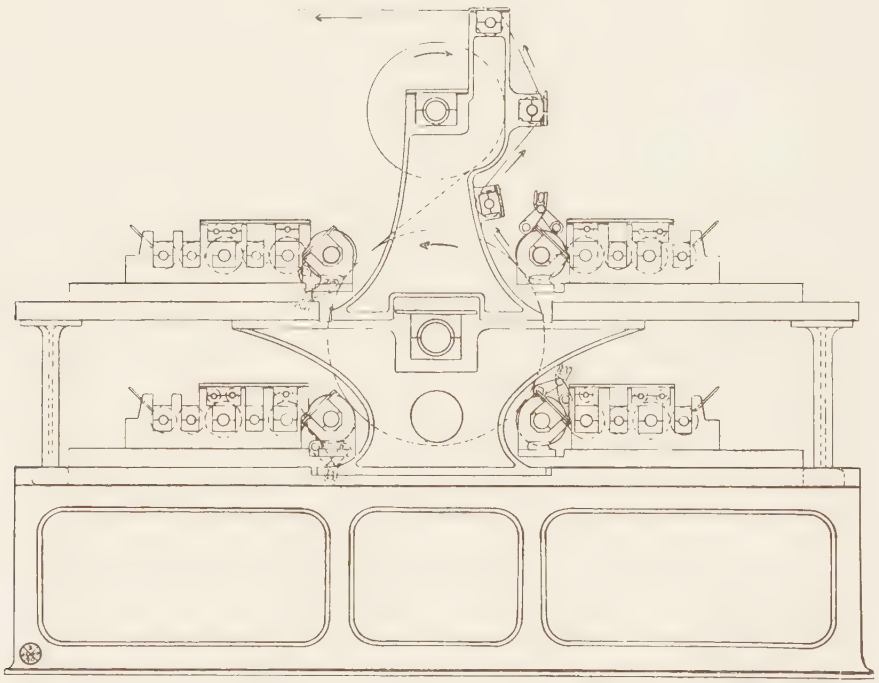
In this all-absorbing heyday of their jubilation they had failed to observe the possibility of two great conditions; one was the probability that some day there might come along some fertile and prolific mind, active and rich in inventive faculty which might endow the lithographic craft with a revolutionary, master acquisition, both in machinery and method, which might not only place it in the forefront of the printers' art but also extend and carry it into other channels of commercial pursuit as well. The other condition, not then fully appreciated by them, was the fact that lithography could also adopt and apply the photo-mechanical methods to itself, as what they (the other crafts) had hitherto done,

and that with even more powerful effect than what the typographic craft was capable of doing.

For lithographic methods alone made the "high-light half-tone" possible: whilst its powers of "unlimited duplication" of an original, by the transfer process, placed it far away ahead of anything that rival processes could offer as an equivalent.

And right here we may unreservedly remark that that is precisely what has transpired.

Within the short period intervening between the issue of the last "Penrose Pictorial Annual" and the present one, there has been launched into the world of practical printing processes, a new revolutionary mechanical triumph, a "CONTINUOUS, ALL CIRCULAR, ROTARY LITHOGRAPHIC PRINTING MACHINE"



which, for the first time, prints perfectly from the complete and unbroken surface area of a metal cylinder, in the pure "planographic" manner; thus making "two blades of grass grow where one only grew before."

Not only does it accomplish this as a potent new attainment, but it also does it from a continuous, solid reel of "paper," "fabric," or "oilcloth," etc., with a continuous self-serving feed, and at a speed hitherto unattainable and unanticipated in the craft.

Yet what is of still further entrancing importance, and interest also, is the fact that it prints either *two*, *three* or *four* colours at one time (simultaneously) and in register.

But the best is yet to be told; this new machine carries the lithographer into "fresh fields and pastures new:" it gives him a positive right of entry into

the third largest manufacturing industry in the kingdom, that of the textile crafts, into that important branch of it known as "Calico printing" and fabric printing generally.

For the first time, we have here a practically commercial method devised, by which all classes of fabric material in multi-colour may now be most successfully printed in oil colours of a permanent base, and in conjunction with designs of an infinitely more delicate and higher grade character, of both illustration and print, than what was heretofore possible, with the older, mucilaginous aniline base of colour arrangement as used hitherto in calico printing.

What this means on fuller analysis is, that by lithography a more beautiful, artistic and pleasing range of colour effects and design will now be done on fabrics than what was within the scope of the orthodox and cruder methods, whilst the troublesome and costly after-processes of "steaming," "soaping," "discharging," etc., as there involved, are all dispensed with here.

Thus economy of both time and material is effected, and the somewhat hazardous and uncertain supplementary processes of calico printing removed altogether, so far as this form of colour printing is concerned.

Again, in the matter of the *initial production cost of the actual printing image*, the outlay involved in the production of a four-colour printing surface by this lithographic method will be but *one-third* of that involved in the present calico printing method, where expensive copper cylinders are essential.

The first cost of the raw metallic printing surface itself as used for this new method will be but one-half of the older method, and it can be re-used over and over again, hundreds of times for new designs: whilst with the existing engraved copper printing surface, when engraved only a few times, it implies a new cylinder shell altogether to replace it.

If the comparison is followed out in connection with the employment of photo-mechanical methods, then this lithographic one has the advantage from every point of view. "Half-tone," "Metzograph grain," "Line" and "Colour" effects, are all at its command, without restriction.

As to the machine itself; the space that it occupies is much less than any other of this class of apparatus, and the cost will figure out hundreds per cent. in its favour: items of consideration which no business men can afford to ignore in these days of keen competition. Yet notwithstanding this, the mechanism of the machine is of the most daring simplicity when balanced with present types. And what is more, it does not require the same large range of supplementary machinery, as what is required in the more ancient methods.

A special feature of this new process is, that a *change of colour can be made in five to ten minutes time*, which, viewed from existing methods, is almost incomprehensible, until it is explained that the mechanism of the machine is duplicated in these parts, so that the twin compartment is made to immediately replace the one just used, whilst that in turn is being got ready for use when next required: the machine in the meantime printing away effectively. There, again, is an enormous saving over the existing order of things, as five or ten minutes replaces several hours.

Another feature which may appear as very remarkable is the fact that a *change can be made from the printing of fabric to that of paper or oilcloth*, etc., involving less than ten minutes adjustments.

So that now lithography can be employed in the practical production of high-class *wall-papers* of a more permanent and artistic nature than before; the dangers hitherto arising from inhaling and breathing poisonous dust colours, dislodged from the unstable and detachable colours, with which our bed-rooms

and domestic living rooms are now decorated, will be here removed, and replaced with a *permanent oil colour*, harmless to health, and more pleasing in character and utility.

It is, perhaps, in the natural order and fitness of things, as well as in consonance with the due evolution of a great industry, that any great changes in it, of an elevating or onward nature, should have the distinction of being promulgated from the very country where that industry has its home, and its world's metropolis.

Thus it is that cotton is monarch in Lancashire, and that a Lancastrian merchant—Mr. J. Hayes (of Hayes, Reynolds & Co.), now of Shirley—has both generated, evolved and adapted this new mechanical process to extended commercial pursuits. The art of fabric printing is now raised to a higher stage and superior plane of attainment, and the boundaries of artistic colour printing methods extended to other channels of service and employment.

An examination of the diagram herewith will convey some idea of the plan of the machine, the British patent of which is No. 9365 of 1907.

Additional full patents have been taken out and granted in no less than *seventeen* different countries of the world, including the United States of America and Germany, which is a most eloquent indication of the validity, reliability and novel type of the patent rights appertaining to this machine and its methods.

Nothing equivalent had ever been announced or attempted before, whilst the closest investigation has since been made that the controlling principles and master patents here involved are incapable of being supplanted, without illegally infringing the lawful rights of the owners.

The accompanying coloured fabric supplement was printed in single colour, at a speed of over 5000 sheets 36×18 per hour, quite comfortably; and can be done at nearly double this speed, both colours being printed simultaneously. The design is a typical one for Manchester goods of this class.

It will probably suggest itself to a good many, that " four-colour illustrated newspapers " or " coloured periodicals," of a decidedly higher order of merit, are now within the range of practical accomplishment.

It also opens out a further sphere of employment for the photo-process trade, in catering for the new developments and requirements which it has already and will further eventually create.

Thus it is in the world of printerdom (" the art preservative of all arts "), as it has recently been in other walks of life such as " Telegraphy " and " Aviation," the profluence of our times, bound up with the ceaseless, probing, inventive faculty of " Man's mastery over Nature," hands down to posterity through us, the heritage and fruits of his silent labours, for countless future generations of mankind to enjoy.

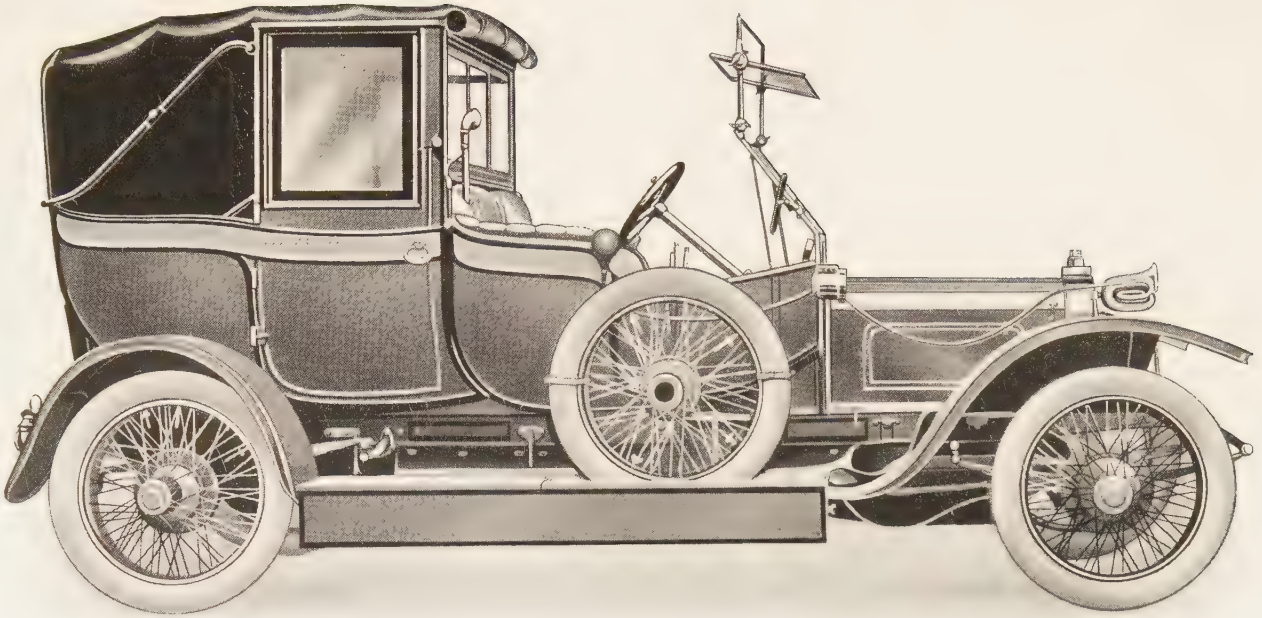
The Tone Photo-Engraving Co.

An Effective Illustration by a Simple Method.

By kind permission of Messrs. Kynoch Ltd

Marshall Engraving Co.

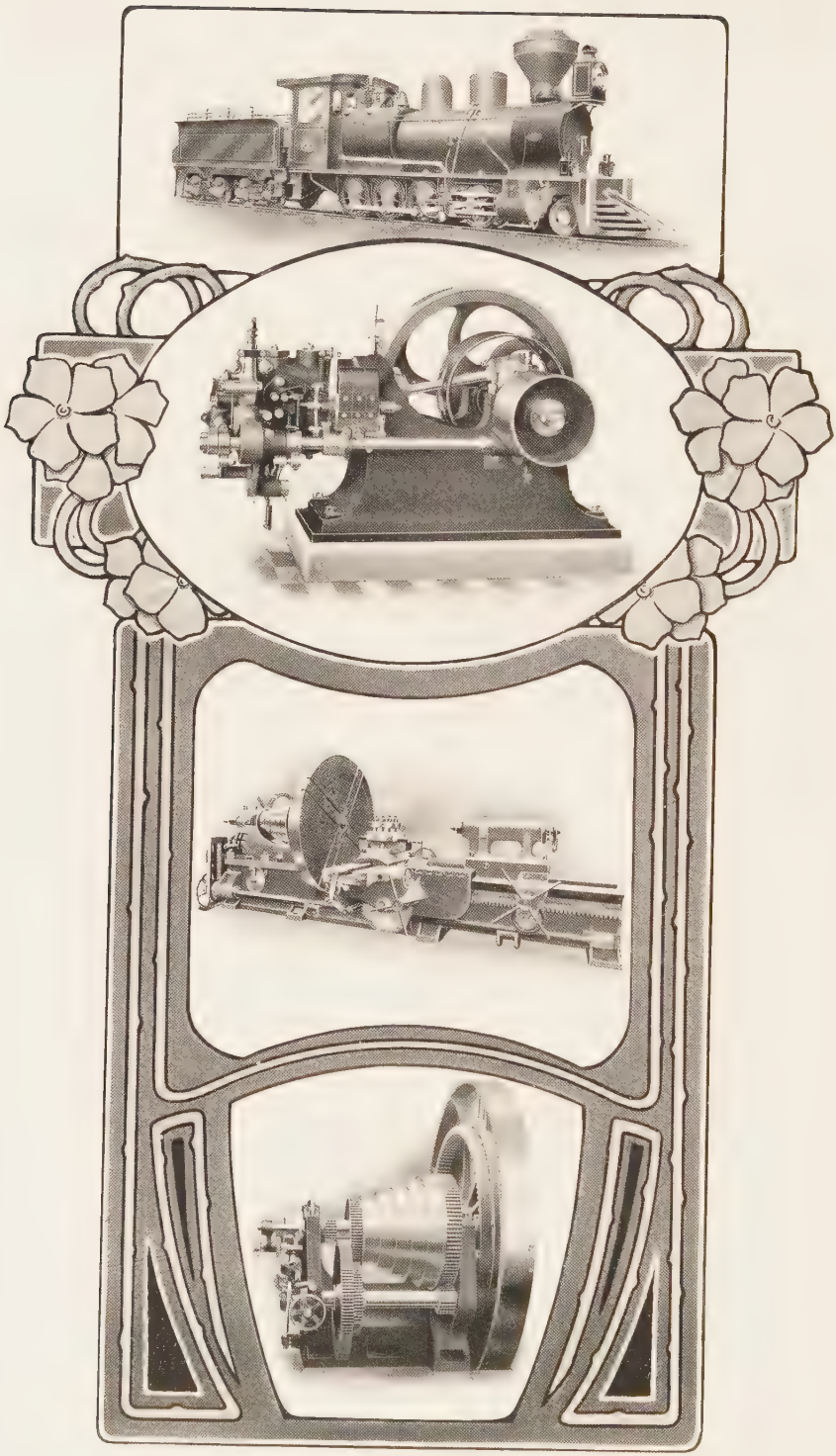
Cover Design for Motor Car Catalogue.



Photograph Retouching and Block by
Ashworth & Meredith.

By kind permission of
Messrs. Clement Talbot, Ltd.

25 H.P. Clement Talbot with Cabriolet Body.



London & Provincial Reproduction Co

Catalogue Illustration.

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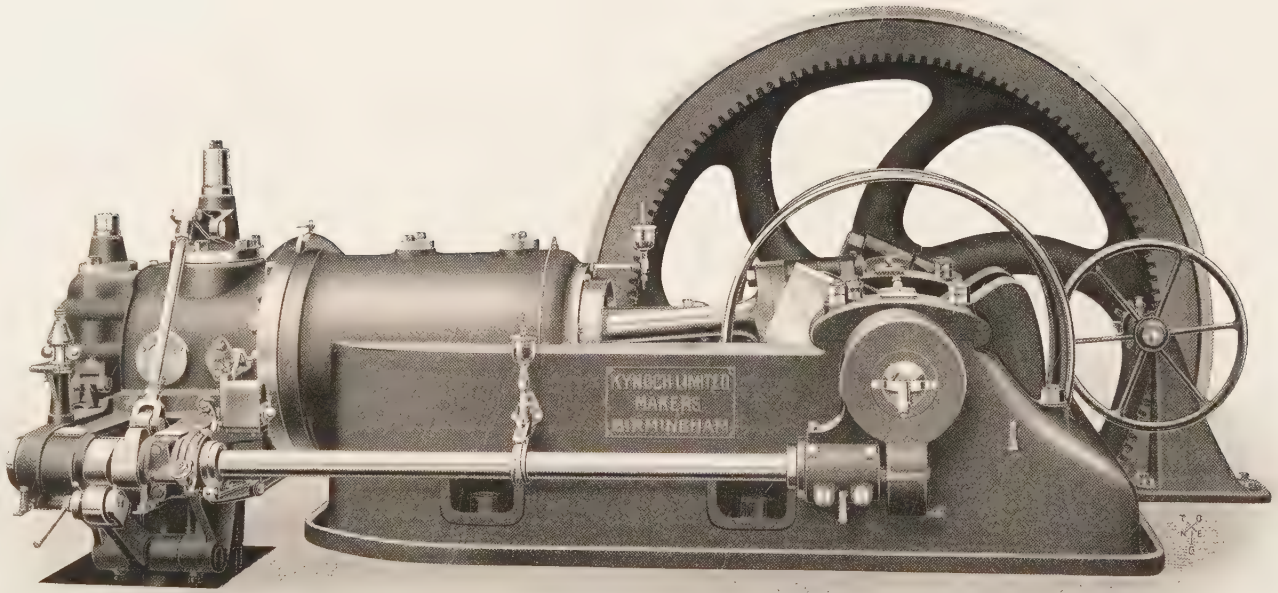
A Catalogue Illustration.



The Tone Photo Engraving Co

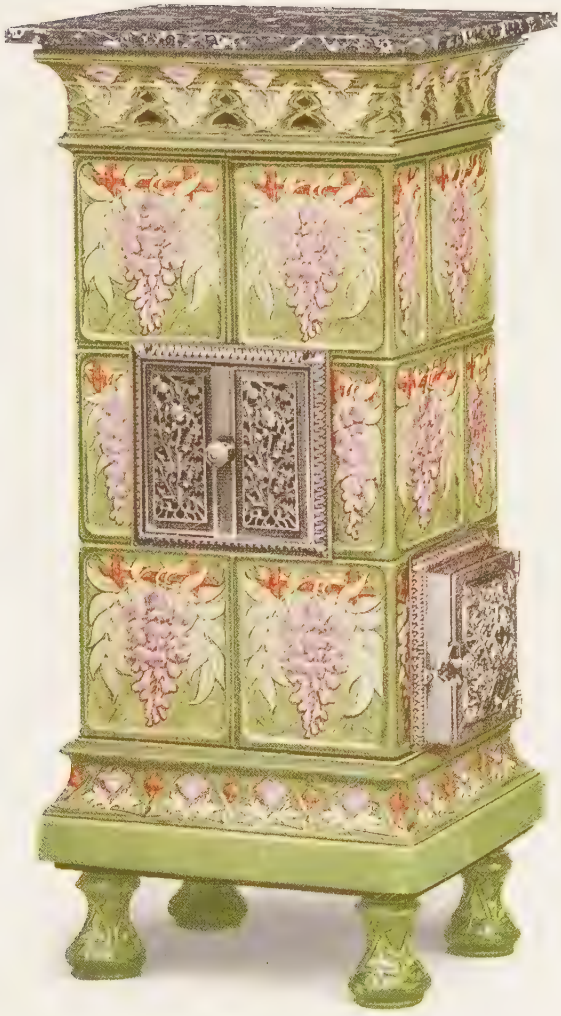
By kind permission of Messrs. Kynoch Ltd.

A Catalogue Illustration.

By permission of the Publishers of "Kunst & Handwerk," Munich

h. Hamböck, Munich.

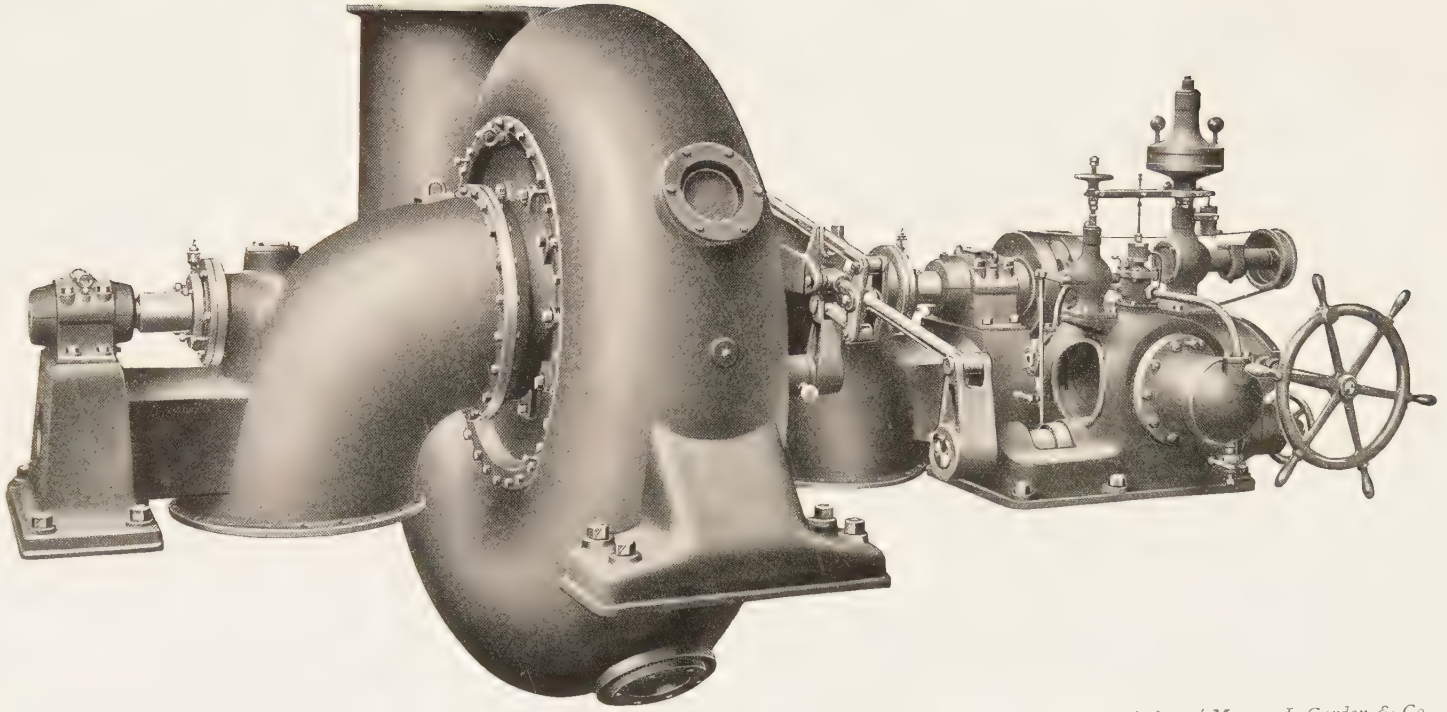
Jewellery.



J. Malvaux. *Inks by Shackell, Edwards & C.*

A Catalogue Illustration.

Reproduced in four printings



Expert Engraving Co.

By kind permission of Messrs. J. Gordon & Co.

Pumping Engine.

Wallage & Gilbett, Ltd.

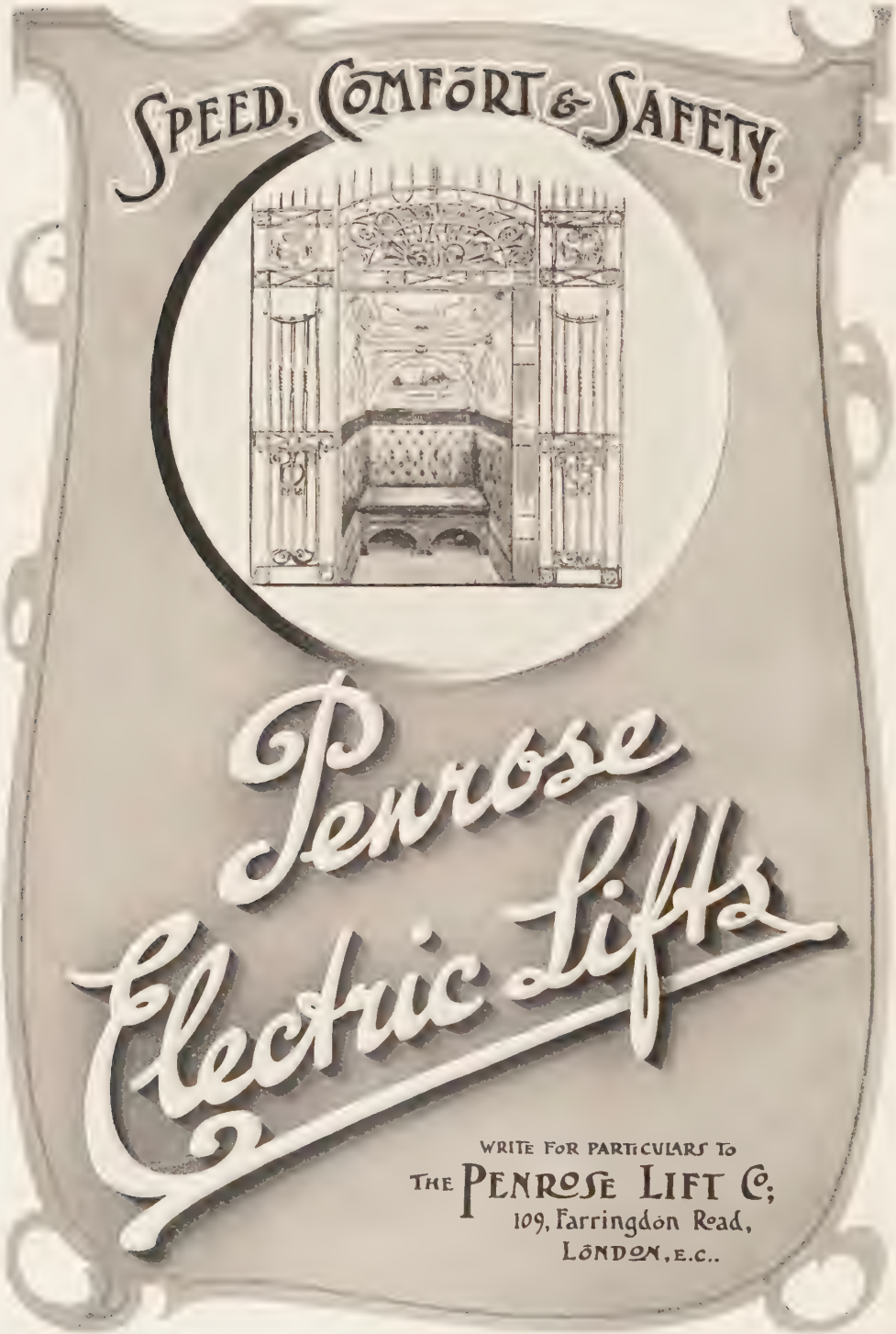
By Permission of The Electric & Ordnance Accessories Co., Ltd.

A Train de Luxe.

Wallage & Gilbett, Ltd.

By Permission of The Electric & Ordnance Accessories Co., Ltd.

Railway Saloon Interior.



Marshall Engraving Co

Design by Harold G Grainger.

An Example of Photographic Designing.

Photographically Designed Advertisements.

He loves me,
he loves me not.

Dean Engraving Co. — Photograph by S. J. Beckett.

SOME really effective advertisements may be prepared by means of photography, by a skilful photographer who can grasp the possibilities of the art. We do not simply mean the photographing of a sitter together with some advertised speciality, a result which is too often stiff and inartistic, but the skilful blending of portions of photographs and designs with effective lettering which has been worked in photographically. A good example of what we mean is shown in the "Penrose Lift" advertisement, which appears on another page.

This has been prepared by Mr. Harold G. Grainger, of Bradford, who has made such advertisements a speciality, after much patient thought and work, besides no little expenditure of time and money.

In this particular case the interior of the lift cage was taken from a water-colour drawing, the lift enclosure of ornamental iron work was a line drawing, the relief lettering was drawn on tracing paper and printed on to the sheet of bromide paper forming the base of the drawing. The cut-out edge of the background is formed by masks, and the tints of the background by shading during the exposure of the bromide paper. The small lettering is drawn direct on the print.

In some cases Mr. Grainger introduces photographs of type designs or printers' rules and ornaments.

It will thus be seen that an endless variety of combinations can be obtained by these means, the whole being blended harmoniously into an original which is exactly suited for reproduction.

Mr. Grainger has shown us a number of advertisements designed in this way — notably various designs for Zambuk, which our readers may have seen in the magazines, and we congratulate him on introducing such a novel and effective line of work.

Beauty and the Beast.

Harrand & Fuller. — Photograph by Reinhold Thiele.

The Holt Etching Machine.

By W. B. P.

EVERYTHING for saving time, everything for decreasing labour, everything for making money. That is the order of the present day, and in the new "Holt etching machine" it may be safely said that all these qualities are combined with the additional advantage of obtaining a better, cleaner and more dependable etch than most of the etching machines now on the market provide.

The writer having quite recently journeyed right across North America, where the Holt machine is in many places well known, has had an opportunity of seeing it in actual use, also of hearing American and Canadian opinions expressed by those who have tested it.

There appear to be many benefits accruing from its use, and which I will touch upon in the order as they appealed to me.

Foremost of all is the extremely small space the machine occupies and the trifling amount of power required to drive it. The floor space actually occupied is only 4 ft. 3 in. by 3 ft. 5 in., while as little as $\frac{1}{8}$-h.p. is required for each machine when in motion. This is a distinct gain to process engraving firms where space is valuable or limited. Moreover, the machine can be run from a counter-shaft or motor direct, the speed required on the shaft being between 150 and 160 revolutions per minute. A $\frac{1}{2}$-h.p. motor is said to be capable of running two machines on a counter-shaft while allowing plenty of margin.

Next I was surprised at the number of plates of various sizes that could be etched at one operation.

The "floating board" upon which these plates are placed measures 26 inches by 20 inches, and the moment the machine is opened this board automatically rises to the surface, while when the lids of the machine are closed the floating board carrying the plates is forced under the etching fluid. The machine is simultaneously set in motion, causing the disc to revolve rapidly.

Now the principal success of the invention lies in an ingenious contrivance of vanes or ridges of varied shapes, that, fixed on the under side of the disc, cause a series of whirlpools in the acid solution within, distributing, circulating and agitating the etching fluid in such a manner that every portion of each plate receives a *perfectly even and equal etching*.

There can be no doubt about this, for it would be impossible to be otherwise, as the most inexperienced eye can detect by inspecting the counter arrangement of the vanes. The machine, too, is one I should imagine likely to last a long time, without any repairs being required, as there is no metal or other material employed in the construction liable to become injured or displaced, while the use of the machine is so simple that any careful lad could learn to work the same successfully in a very short time.

It is claimed by the inventor, who is the son of a well-known practical man of many years' experience, that the machine does not etch raw or destroy the delicacy of the half-tones, and judging from the many excellent examples I have seen actually etched there is no reason to distrust the statement, for whether in half-tone or line the result has been the same—a good, direct *downward* etch.

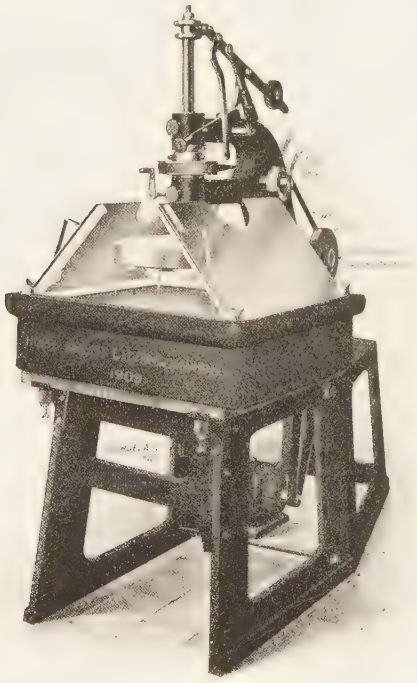
Two machines are necessary for the ordinary general process engraver—one

for copper half-tones, the other for zincos or line subjects, the parts coming in contact with the acid of the latter being made entirely of aluminium.

The necessity of this is owing to the solutions required for the two processes being of a totally different composition.

A word or two might be said with regard to time, which is, of course, an important factor. Mr. Holt does not pretend to claim the greatest speed for *single* or *individual* plates, but for plates *in bulk* he affirms there is no machine approaching it for speed and uniformity of quality. As his machine is capable of etching a dozen or even more plates at one operation with equally good result the advantage is obvious, the total time for half-tones on zinc being about three minutes.

Vignettes can be painted out and etched without hindrance to the ordinary run of work, thus effecting a saving in cutting and routing.



By reason of the box-like arrangement of the machine and the fact of the lids being closed when working, it stands to reason that very few noxious or injurious fumes are suffered to escape, therefore from a health point of view it is a distinct improvement on the old rocking baths and many other systems of etching.

The Holt etching machine is the outcome of careful study added to long experience, and when it is considered that one of the largest and most important firms have installed several of them, it goes far to verify the quality of the machine.

I understand a large number of machines are now being built for the export trade, for Canada and the United States it is beginning to be so well known and used that I feel confidence in making a concluding assertion, which is—the Holt etching machine has come to stay.

The Bichromate Disease.

By J. GASKIN WOOD.

THE MORNING PIPE.

EASOPRINT ENGRAVING HOUSE. Photograph by A. W. GOODMAN.

DURING the past year or two there seems to have been an increase in the number of process workers afflicted with this disagreeable complaint, and, generally speaking, the workers are naturally very reluctant to give up work or give their hands or arms a chance of mending until they have become so bad that they cannot possibly continue working, and have then to be on the sick list for varying periods. In one case I know of a female worker's hands being in a dreadful state for fully two years, and having myself at one time been a sufferer, it became necessary to try some method of overcoming the evil or at least lessening the danger resulting from the continued use of any of the bichromates, even in weak solution. Being very sensitive to it, I was at one time seriously handicapped, as the slightest splash of bichromate, if unnoticed and allowed to dry on the skin, set up such irritation as to become unbearable, and even then thorough washing did not remove or allay the sensation.

The following method was then adopted and found to be thoroughly satisfactory. Take an eight-ounce bottle, to be used as a sprinkler. Cut a V-shaped notch down each side of the cork, then fill the bottle as follows :—2 oz. glycerine, ¼ oz. liquor ammonia, 6 or 8 drops of carbolic acid and fill up with water. Keep this in the work-room handy for use. After using bichromate rinse or wash your hands and sprinkle a few drops of above on them and rub well into the skin, then dry them or rinse and dry. If this is done regularly there need be little fear of the disease breaking out. I have managed to keep clear of it for many years by adopting the above method, but even now if I omit the cure and allow any bichromate to dry on the skin it is not long in making itself manifest.

A WARM QUARTER.

W. F. SEDGWICK, LTD. Photograph by WEST & SON.

J. Furnells.

Inks by Shackell, Edwards & Co., Ltd.

An effective letter-heading design suggesting in a striking manner the range of shades obtainable by tricolour.

"PRIDE GOETH ABROAD"

Four-Colour Print from Painting

Printed with Four-Colour Process Inks
made by
BERGER & WIRTH, LONDON

"FARM YARD IDYL"

Four-Colour Print from Painting

Printed with Four-Colour Process Inks
made by
BERGER & WIRTH, LONDON

PRINTED ON THE HARRIS" OFFSET PRESS
in six colours.
BY
WATERLOW BROS. & LAYTON, LTD. Colour Printers.
BIRCHIN LANE & UPPER THAMES STREET, E.C

Photography for Business Purposes.

PHOTOGRAPHY for catalogue use and reproduction generally is a specialist's work and quite distinct from portraiture. A photographer who may be eminently successful as a portraitist, generally speaking, has but a faint idea as to the essentials desired by the process worker in photographs for reproduction.

A business having for its special object the making of photographs for reproduction may, therefore, serve a very useful purpose, and prove a great convenience to manufacturers and business firms.

A number of large manufacturing firms now retain their own photographer, and no doubt can keep him fully employed photographing new lines as they are created, but there is a much larger number of firms which have not a sufficiency of work to keep a man continuously employed.

To such firms it is a boon to have at call the services of a firm knowing exactly the necessary requirements of the blockmakers in regard to originals suited for reproduction. Much unnecessary expense in retouching may be saved by having photographs of the right kind.

MARSHALL STUDIOS, MARSHALL ENGRAVING CO.

For several years past the Tella Camera Co. have laid themselves out particularly for this class of work. They have a large staff of skilled operators and can despatch one of these men with his camera outfit to any part of the United Kingdom at short notice.

The head office of the Company is centrally situated at 68, High Holborn, W.C., and they have recently installed large studios at 59 and 60, Eagle Street (about two minutes' walk distant), where an installation of powerful arc lamps enables them to photograph any objects without depending upon the weather or light. Special dark-room facilities and systematic handling puts them in a position to supply finished prints the same day as the photographs are taken, if desired, a point which printers and others concerned in the preparation of catalogues will appreciate.

The head office and studios are connected by private telephone line, so that the management is in constant touch with the work in progress. A staff of black and white artists on the premises is at the service of clients if they require the complete preparation of photographs for reproduction. The advantage of such facilities must be obvious, and we feel sure that many business men will be glad to know that such a well-organized business exists.

A New Transparent Drawing Surface.

ANYONE who has to make a copy of a photograph or of some existing sketch or print appreciates the convenience of being able to lay a sheet of transparent tracing paper over it, and thus be able to follow the outlines or contours of the picture. For making tracings as a guide for further drawing, or for the purpose of lithographic transfer this method can be readily employed, but when it comes to making a finished drawing for process reproduction it is not so easy a matter as the various tracing papers are generally more or less yellow and some are rough and present an unlevel surface for photographic copying.

This difficulty is entirely overcome by the use of the " Norwich film," which has been recently introduced. This consists of a transparent sheet of gelatine which is matted on one side with a grain. This serves as a " tooth " for the pencil or crayon, or as a pleasant surface to work on in line with the pen or brush.

If the drawing is made with the special ink or crayon recommended the film can be converted into a photographic negative for printing direct on to sensitized zinc or copper. This is done by simply flowing the film drawing over with a special red varnish, which when dry permits of the lines or grain of the drawing being cleaned off with any suitable solvent, such as gasoline, petrol, benzole or turpentine, leaving the lines or drawing perfectly transparent.

Such a negative can then readily be used exactly as an ordinary photographic process negative. If a positive is required, as for intaglio biting, this reversing process is not necessary. The film is simply printed from in the state in which it leaves the artist's hands.

Should it be desired to print lithographically it is possible, by drawing with writing transfer ink, to moisten the film and transfer direct to the plate or stone.

For engineers' or architects' drawings the lines may be drawn with pen or pencil or both combined, and the film drawing printed on to ferro-prussiate or " blue " paper.

The film has also been found useful for transferring drawings to china, silver, etc., by damping the gelatine and applying in the same way as a lithographic transfer.

The transparent sheets are very reasonable in price and can be obtained in three grains, and in sizes up to 17×22 inches. The materials for use with it are simple and inexpensive.

A booklet of instructions is issued by Penrose and Co., from whom the film and necessary materials may be obtained.

The little sketch herewith has been drawn on the Norwich film by Mr. T. W. Henry, and the film used as a negative for direct printing on zinc. Examples of pen drawing will be found in the advertisement on another page.

Offset Lithography.

MUCH has been written about offset lithography, and the pros and cons pertaining thereto, but there is still room to write more concerning it. Every day we see fresh developments in this art, and there is no doubt that it has been a most valuable acquisition to the modern lithographer, in its practical form, as it has certainly not only given him that work which he was losing, but it has actually enabled him to capture trade from his *confrère*, the letterpress printer.

It must be clearly understood that, although offset lithography, as now applied and produced, is a rival to letterpress work, at the same time one must not run away with the idea that because of this point it will diminish letterpress work.

Offset lithography, as it is developed, will bring in its own wake a larger demand for a certain class of work, and various classes of work which are but in their experimental stages at preesnt. Thus, as will be seen from the various specimens appearing in the present Annual, there is very little which cannot be printed by the offset process.

When offset lithography was first practically brought on the market by the invention of the Harris automatic rotary lithographic offset press, practical lithographers smiled at the idea of obtaining perfect lithography at 5,000 impressions an hour—this has been done, and is being done every day by some of the best-known houses in both England and America. This speed, however, we believe is only possible on the Harris offset press.

It is sometimes claimed by part of the trade catering for this class of machinery, that there is no necessity to run at this big speed, but where a printer has a machine capable of turning out lithography at this rate, he has the advantage of reducing expenses on output from a working standpoint, and although some people deride the idea of quick work, it is most essential for the bustling up-to-date printer who has plenty of contracts and little room in which to handle them.

The machines have been brought up to such a state of efficiency that not only are they capable of producing the best black and tinted work, but colour work of several colours can be produced with the greatest satisfaction. By referring to the product emanating from the house of Messrs. Waterlow, Brothers and Layton, Ltd., printed on a Harris offset press, our readers will agree that one of the finest results has been obtained in colour work, and for a six-colour specimen the work stands out as though printed on an old-style machine, with upwards of twelve or more colours in its production. Here, not only are tints shown, but also solid bodies (both obtained from the same plate in one operation), which hitherto have been disputed as capable of production on the offset machine, and surely this answers the machine maker's claim in every sense.

Special attention might also be drawn to the purple, which we believe is always a difficult colour to produce on any lithographic machine.

It is generally contended that colour work produced on an offset press invariably shows dull, but upon referring to the picture under discussion it will be readily seen how full of life the colours are.

With capable workmen who take an intelligent interest in their machine, with sympathetic masters and a first-class machine, the ordinarily intelligent

lithographer is enabled to produce the very finest possible work obtainable in the lithographic world.

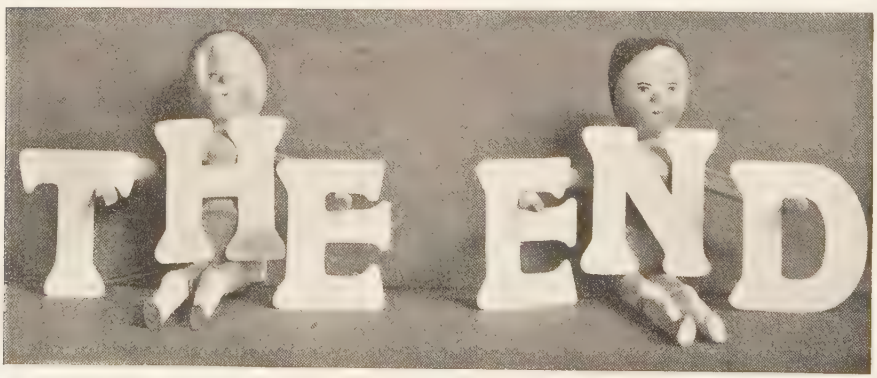
We are given to understand that the order for this special job was only given on October 31st, and that the artist's picture was painted, and the whole process which is usual to such a publication was completed by the 12th November, thus making only eleven working days to produce enough copies for the first edition of this Annual and some thousands of specimen copies besides.

We would ask our readers to compare the foregoing facts and results with the old style of printing, when we think it will easily be seen that they were impossible to obtain excepting by multiplying the machinery, or producing the job on an automatically sheet-fed quick-running offset press.

Letterpress work is now to be had quite easily from the offset press, by means of the double transfer, and the results are equal in every shape and form, provided the transfer has been properly handled, to anything produced by a letterpress machine. Furthermore, there is not the same chance of " thickening up " and bad printing, as once the plate receives the ink and gives it off to the rubber blanket, the blanket can be relied upon in its turn to give a thoroughly perfect and clean result to the sheet passing through the cylinders.

Experiments and runs with half-tones have also proved how exceedingly well this class of work is suited to the rubber blanket press, and although the printer who instals such a machine must not think he is going to master the same in twenty-four hours, he should comfort himself with the reflection that Rome was not built in a day, any more than the offset process was mastered in that time, but provided he will persevere and have a little patience, there is not the slightest doubt that he can obtain the very finest results, and a paying proposition by the installation of a rubber blanket offset press.

We understand from the Lanston Monotype Corporation, Ltd., of 43 and 43a, Fetter Lane, E.C., who are the sole selling agents for these presses outside the United States of America, that arrangements have been made whereby any printer who is specially interested in their machine, can see it in various centres of England, and we would, therefore, strongly advise those printers who are considering the installation of an offset machine, to thoroughly examine the " Harris " before definitely deciding to put in one of these machines.



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Photograph by K. F. Bishop.

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have now been delivered,
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WEEKLY.

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Leads the Field

Best RESULTS at Lowest Costs.
The MOST IMPORTANT
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AUTOMATIC FEED: 5,000 Sheets per hour.

SIZES: From Crown to Quad Royal.

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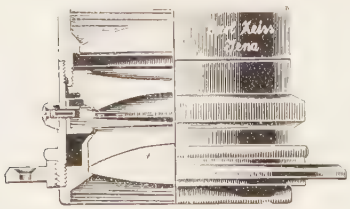

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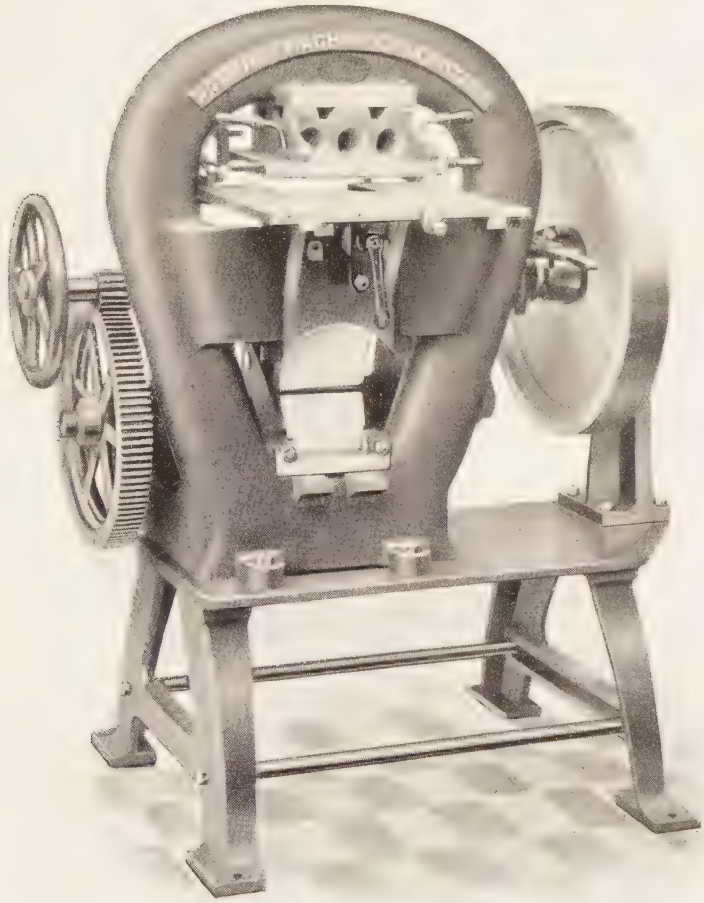

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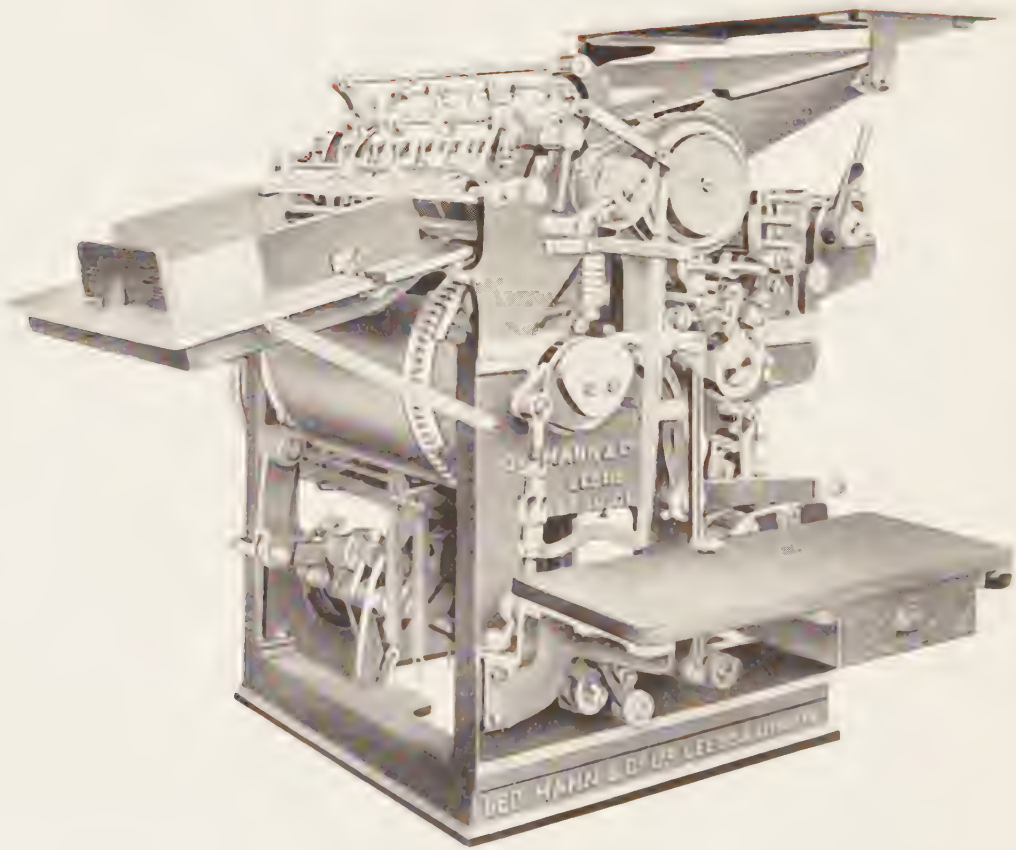

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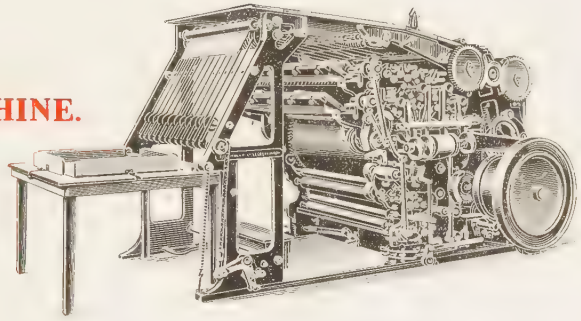

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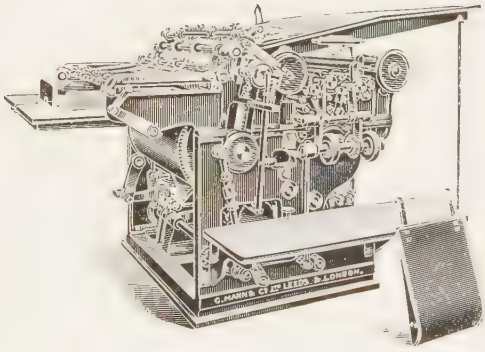

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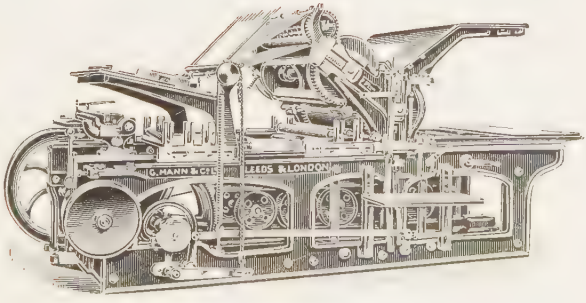

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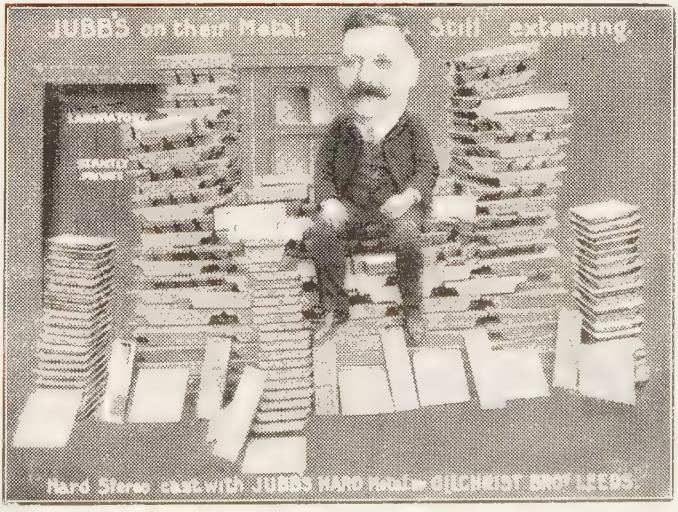

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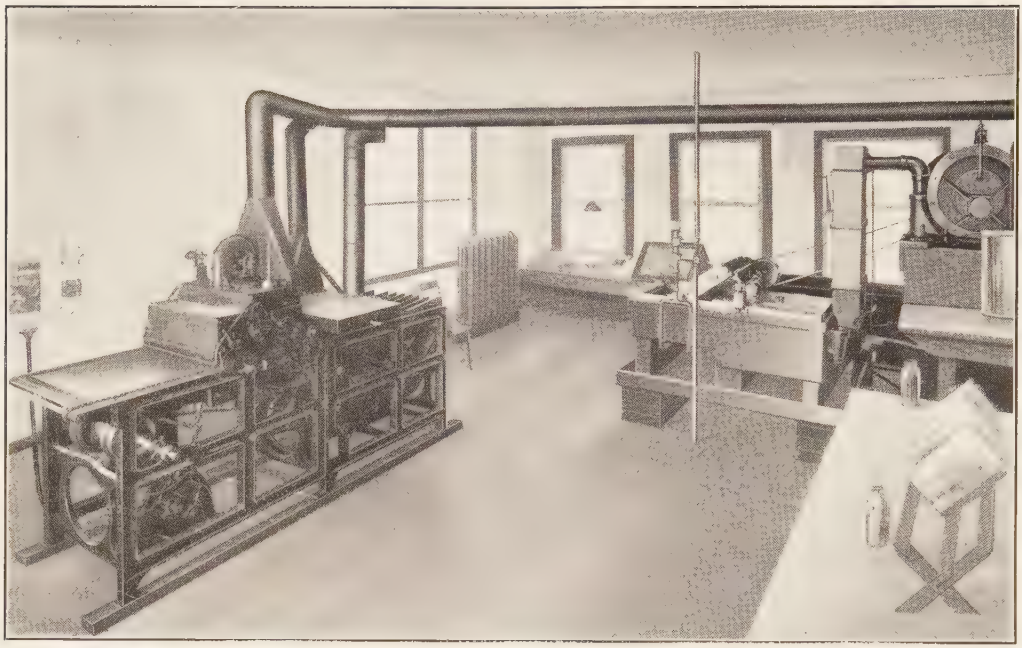

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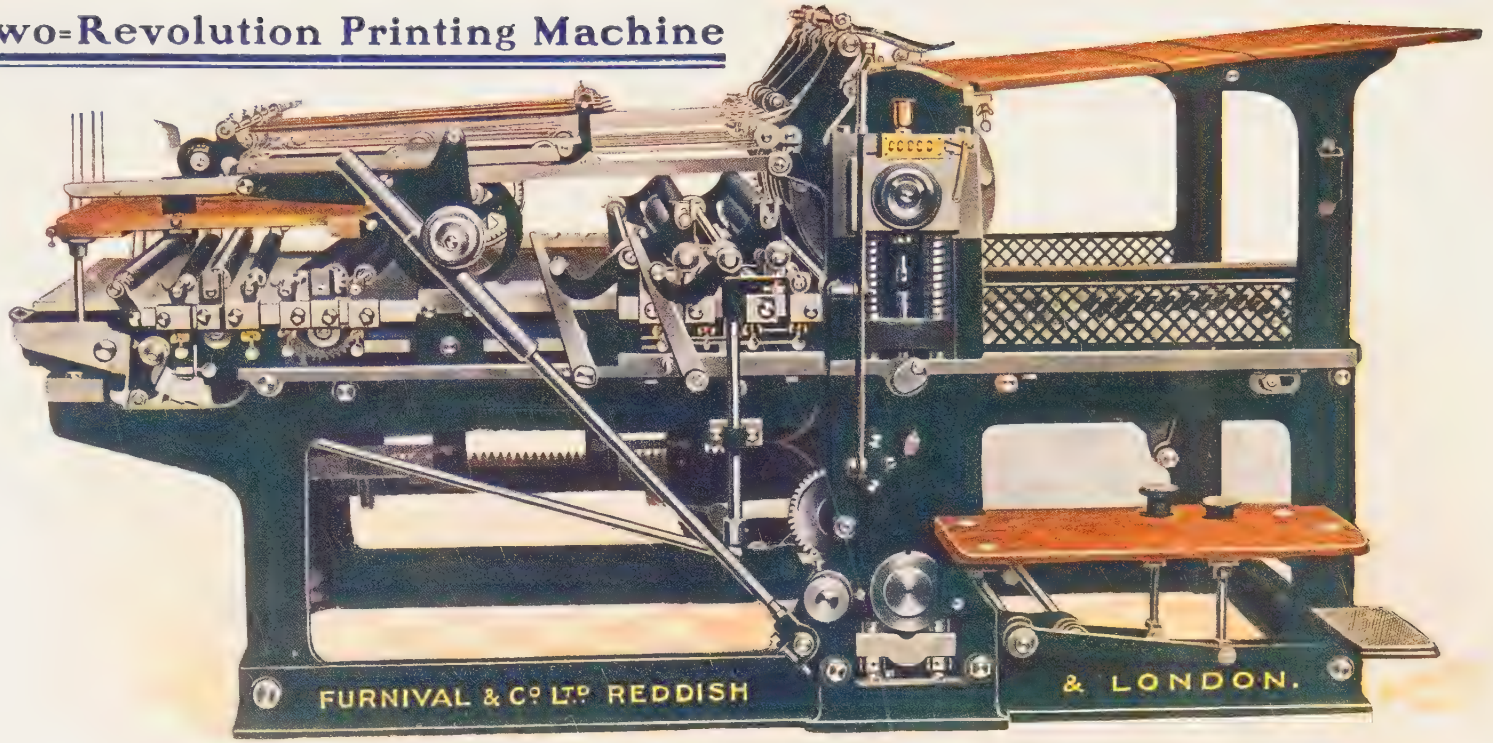

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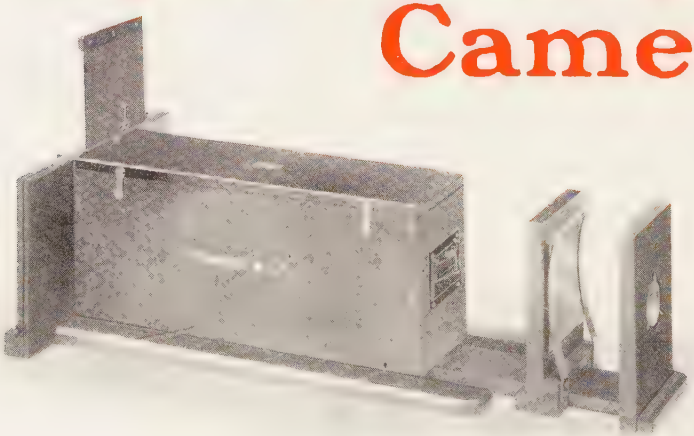

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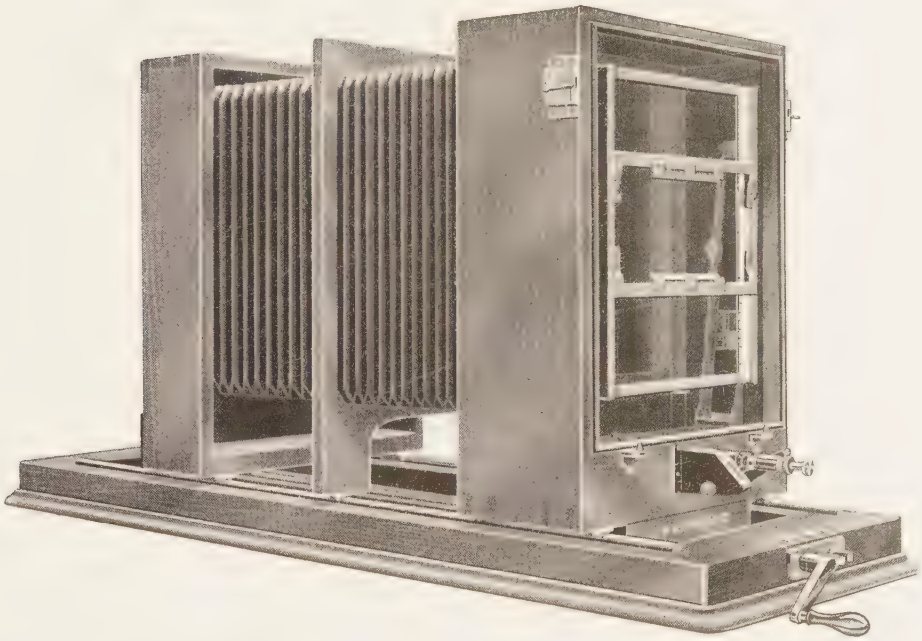

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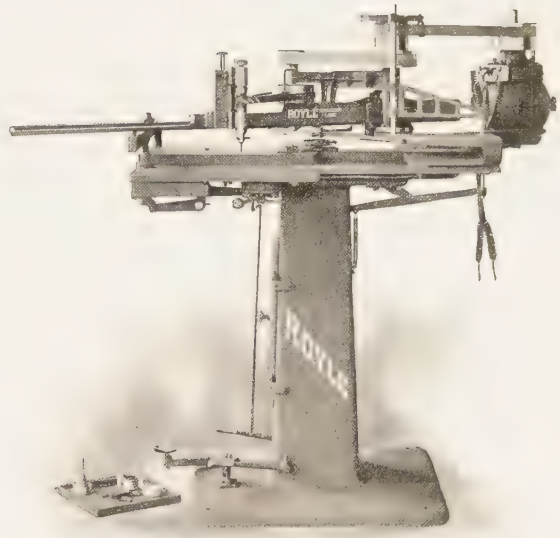

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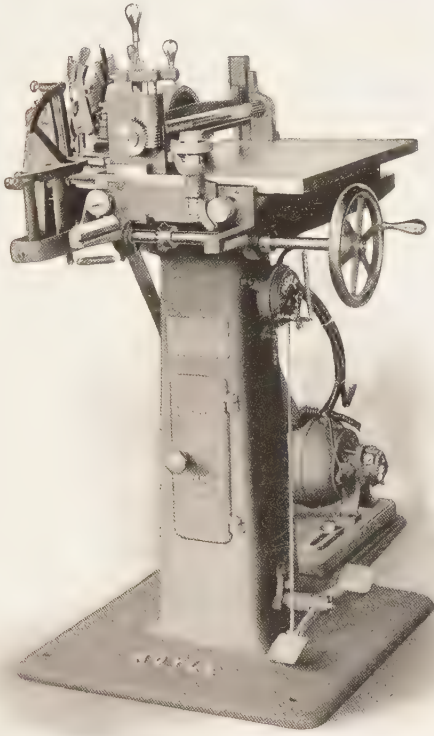

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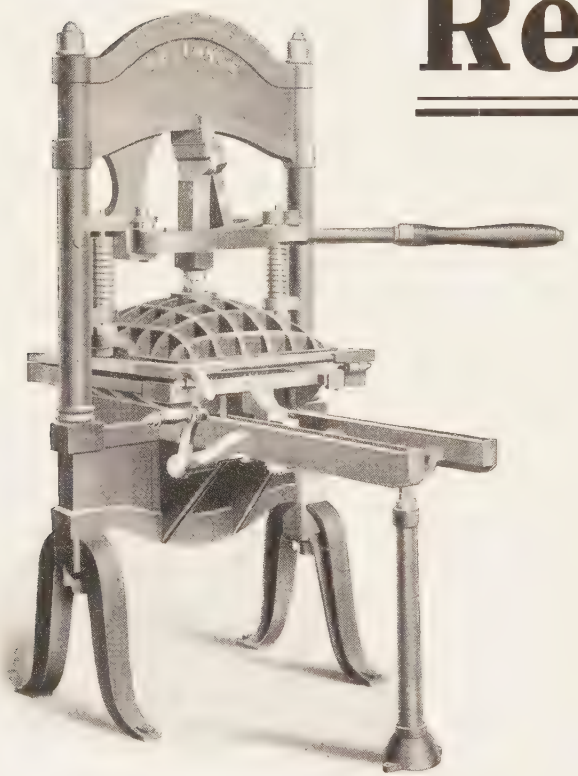

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One Fifteenth the cost of Gas.

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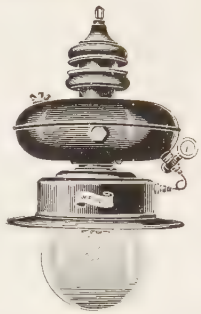

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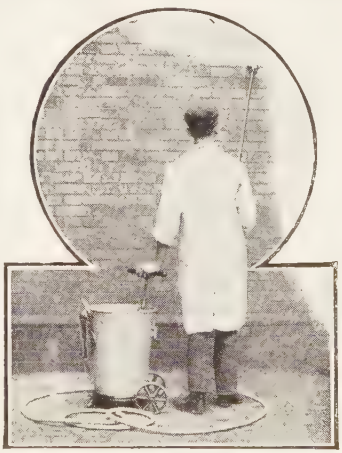

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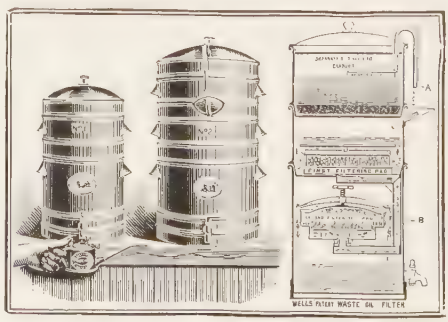

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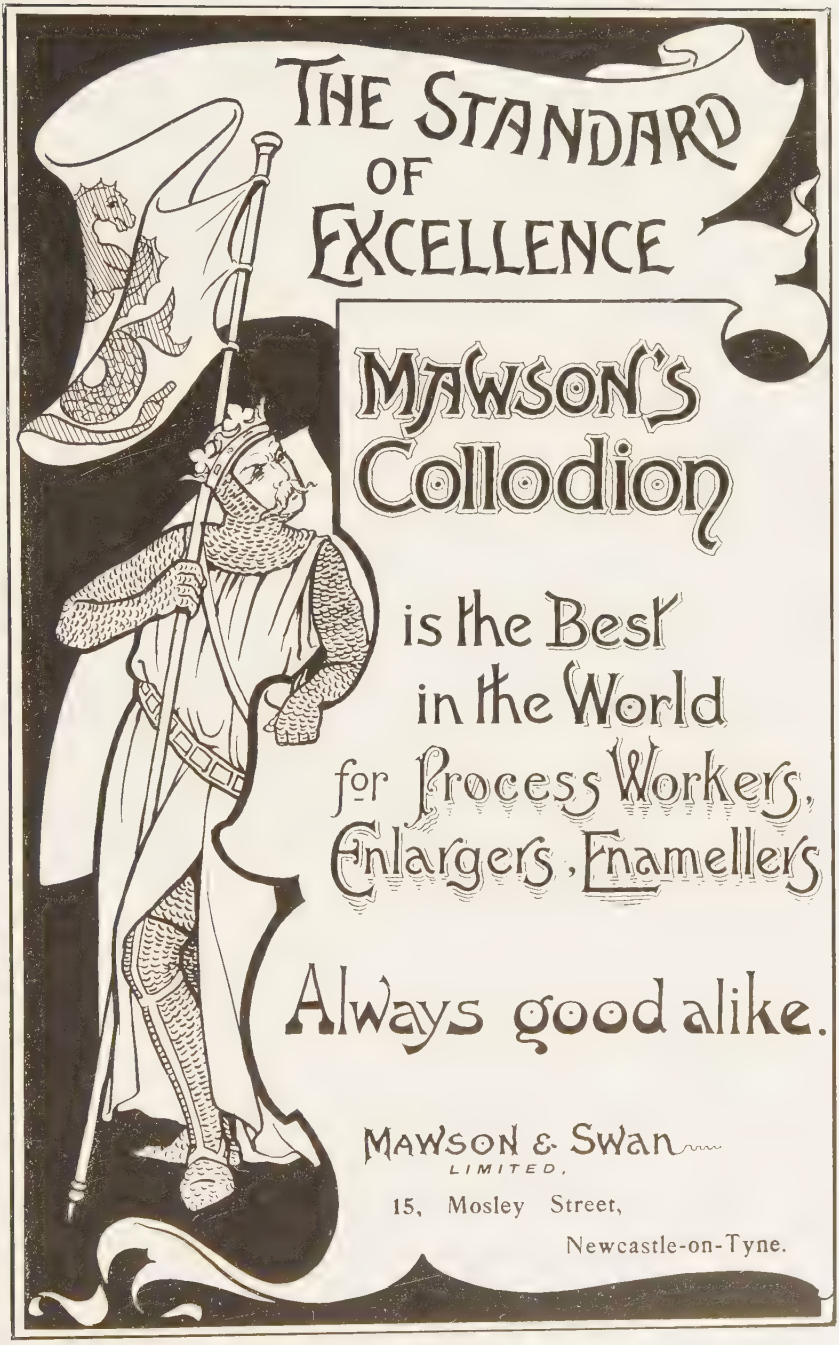
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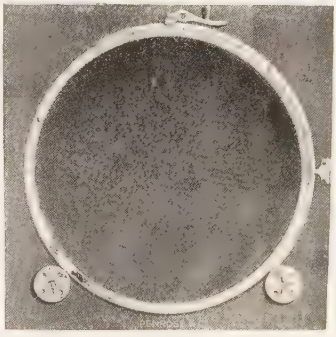

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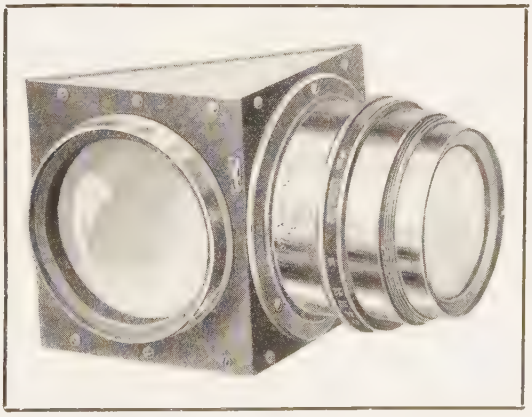

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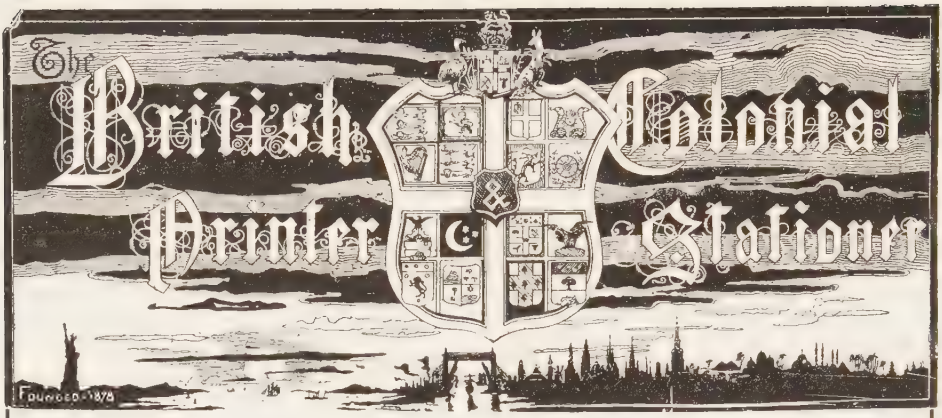

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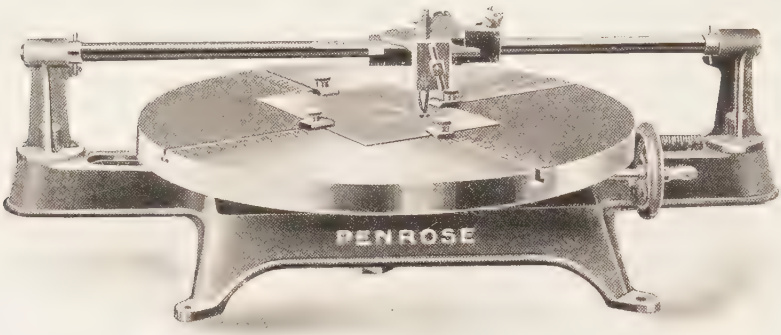

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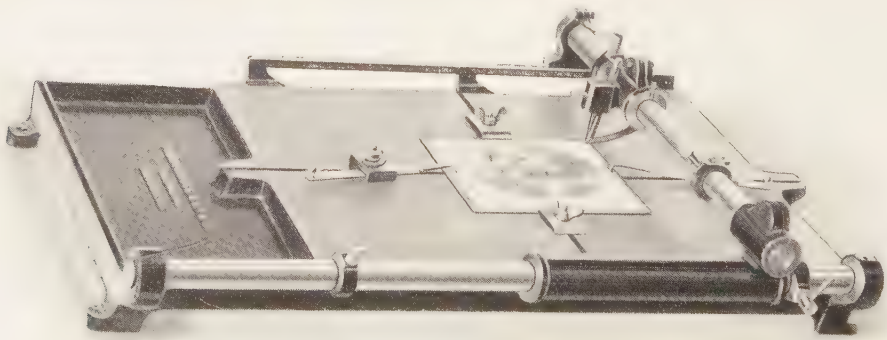

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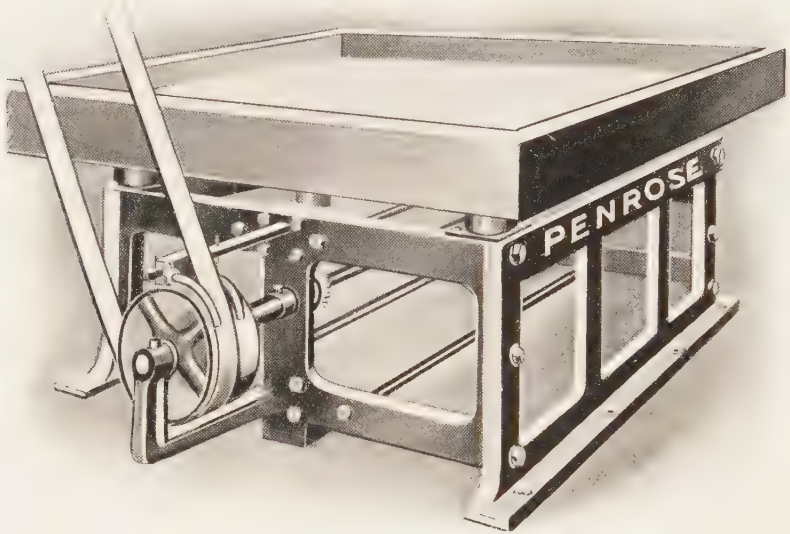

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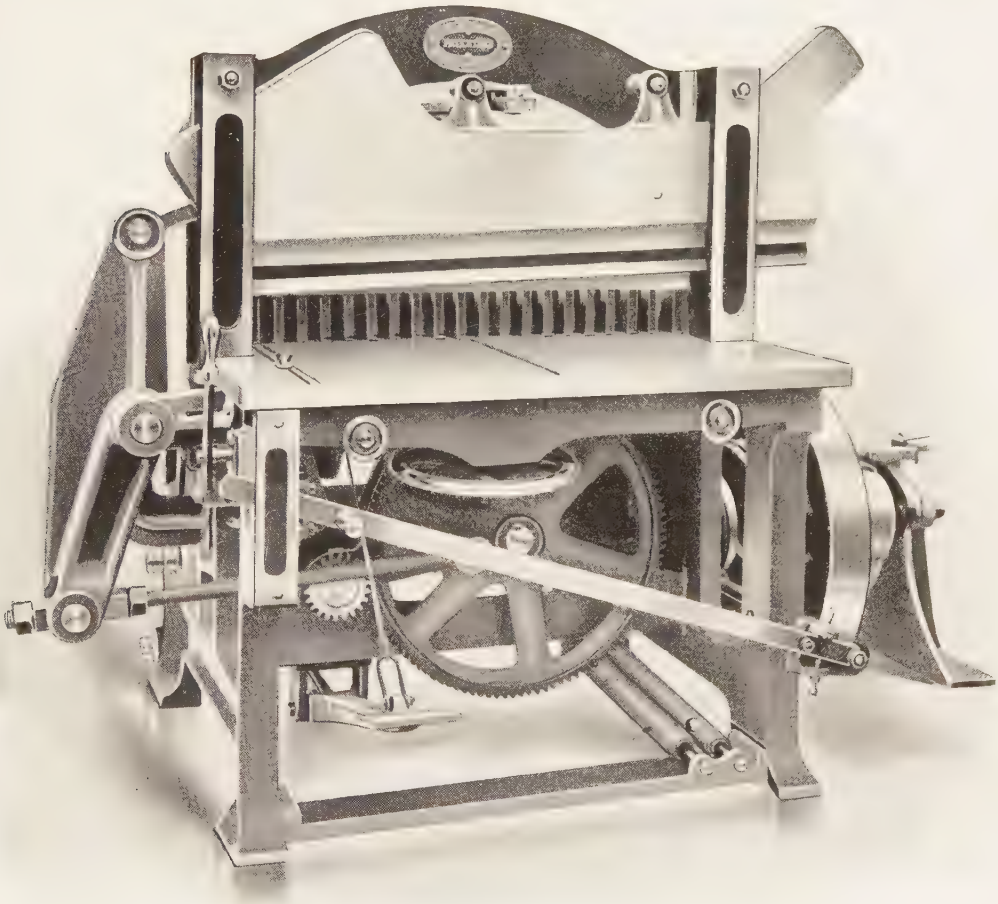

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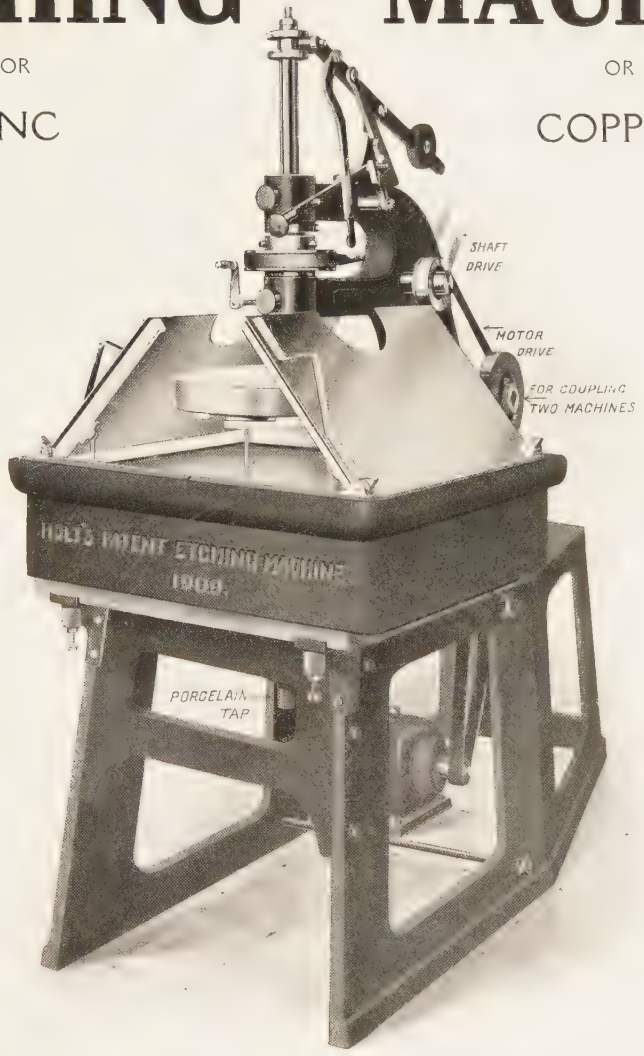

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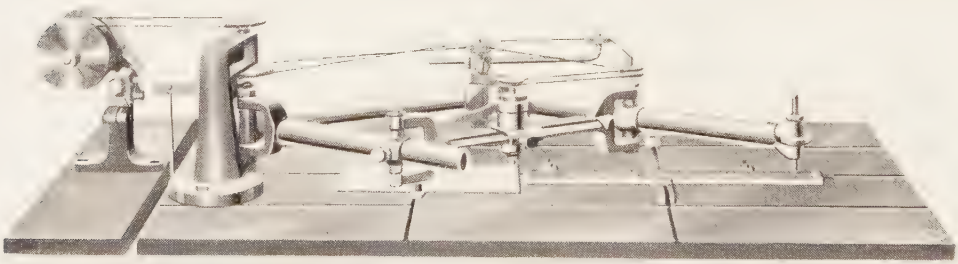

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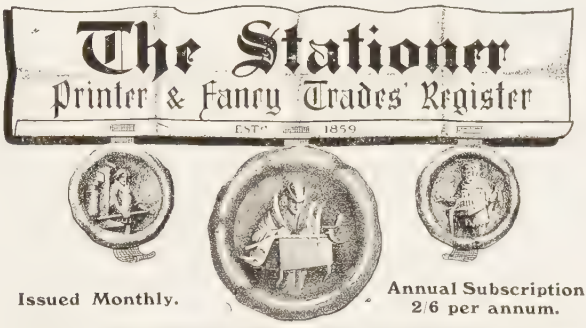

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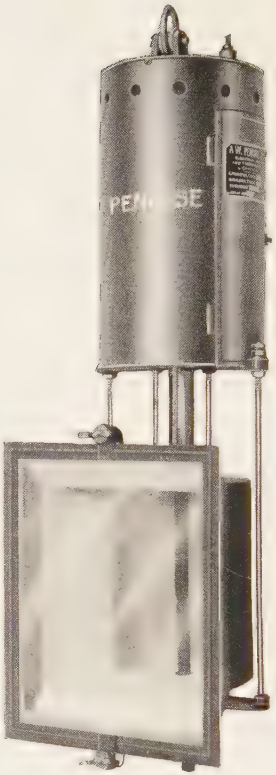

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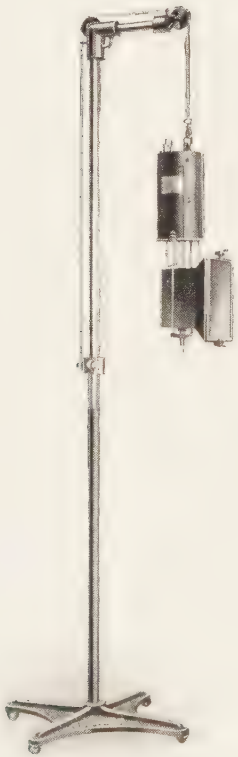

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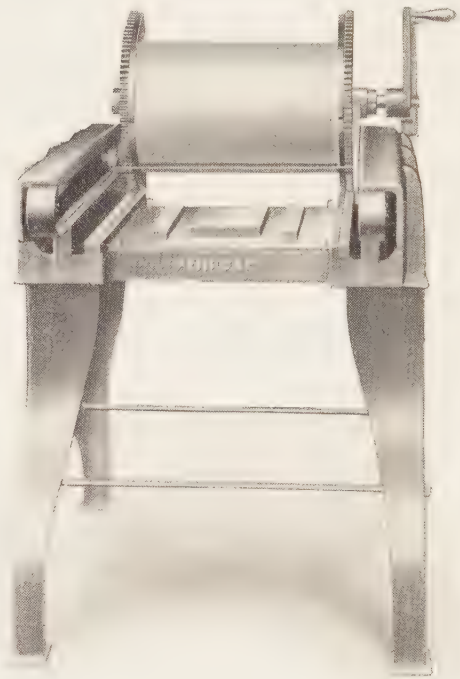

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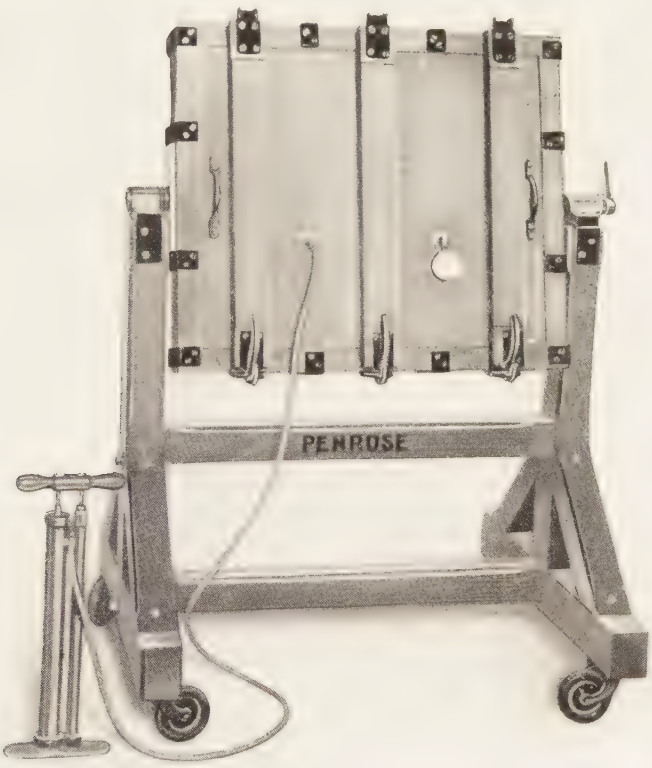

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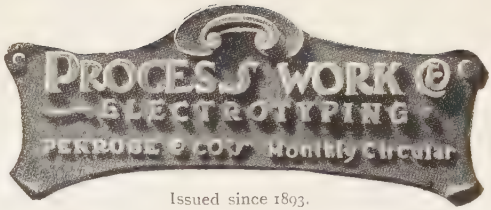

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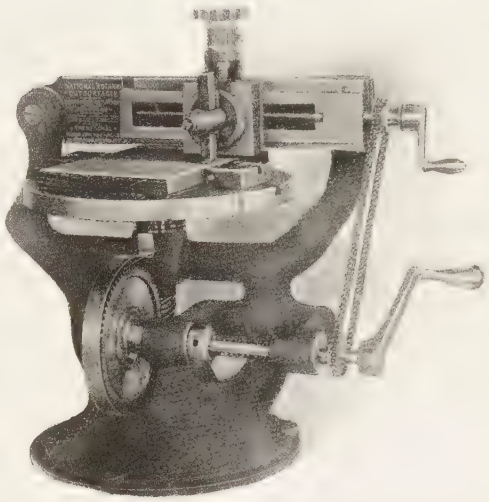

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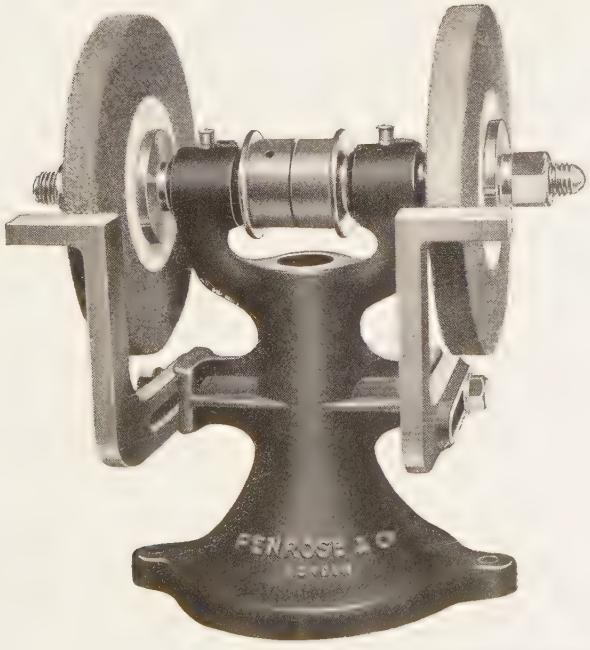

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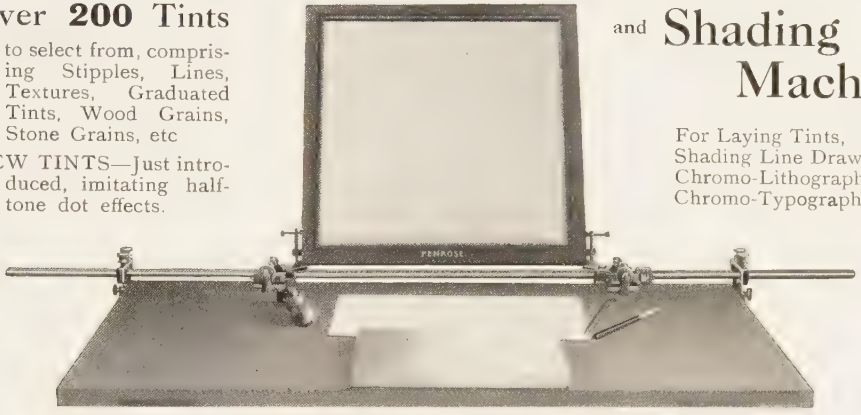

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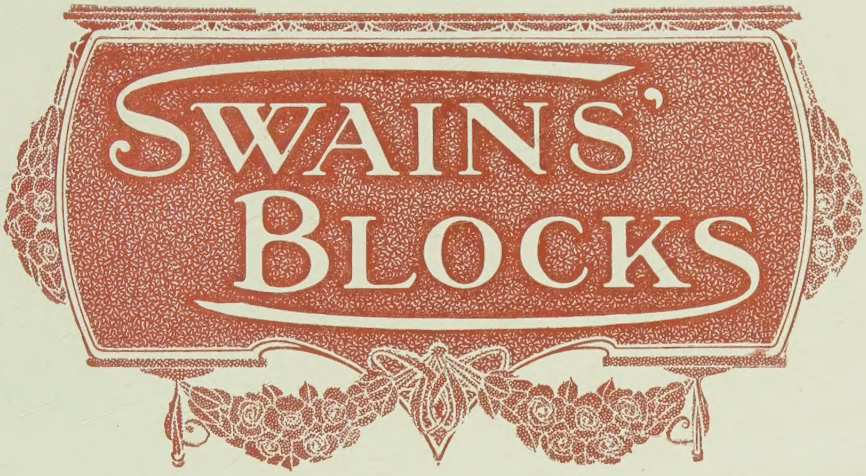

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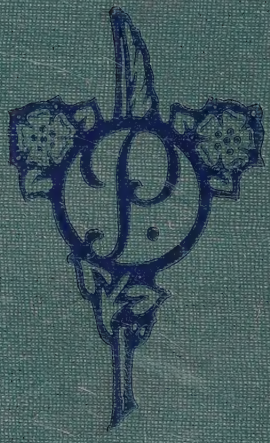
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